The American horologist and jeweler

INCORPORATING HOROLOGY

19 November, 1952 No. 11

FOR ADVANCEMENT IN TIMEKEEPIN

the world's finest watch crystal made better!

ALL ELECTRO-SEAL ROUND CRYSTALS ARE NOW MADE OF

Electroglas

THE WORLD'S FINEST PLASTIC FOR WATCH CRYSTALS

AT NO INCREASE IN PRICE!

SIZES LENTILLES... $1.50 doz.

Cabinet Assortments
205 sizes-1 each-$27.50
205 sizes-2 each- 53.00
205 sizes-3 each- 76.50

SIZES FLAT TOPS... $2.50 doz.

Cabinet Assortments
144 sizes-1 each-$32.00
144 sizes-2 each- 62.00
144 sizes-3 each- 90.00

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...ZES • 18 TO 30 • IN CABINET
...95 • 2 ea. $12.95 • 3 ea. $18.95
...ZES • 11 TO 35 • IN CABINET
...95 • 2 ea. $24.95 • 3 ea. $36.95

Electroglas is an entirely new superior watch crystal plastic and it is exclusive with Electro-Seal. It was developed to eliminate crazing—and it is guaranteed to end your crazing problems. ***End breakage and crazing with Electroglas.***

Electroglas was tested for over 9 months—then tested again by the watch case manufacturers—and subjected to chemical, physical, atmospheric, shock, chip, break, shrink and craze tests. As a result, it is now used by the watch case manufacturers in preference to any other plastic crystals.

ELECTRO-SEAL WATCH CRYSTAL CO.

723 SEVENTH AVENUE • NEW YORK 19, N. Y.

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of the Month

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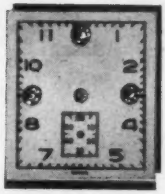

Suggest a 3 Diamond Dial —Now available for all popular Watches

YOUR COST AS LOW AS $6.75

MORE PROFIT — REFINISH THE DIAL WITH THAT REPAIR JOB

ADD TO THE PROFIT OF EVERY REPAIR JOB

Suggest a dial refinish with that repair job. Any dial can be refinished in the 3 diamond style, or a new dial can be furnished. INTERNATIONAL carries one of the largest stocks of shapes and designs. Ask your jobber to show you an INTERNATIONAL 3 Diamond dial, the sparkle and beauty of this dial will sell on sight.

Any Watch Dial Refinished like the Original--

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International uses the fastest possible delive service.

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As watch dial specialists, we carry a very large stock of ma factured dials in all styles and shapes, ready for immedia shipment.

Write at once for International's style and shape sheets. You constantly refer to their source of useful dial information.

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YOUR WATCH WORD — INTERNATIONAL DIALS.
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17J ..... $ 5.00
7J ..... $ 3.75
AS 1012 (5½)
17J ..... $ 7.00
AS 976 (5L)
17J ..... $ 6.50
AS 970 (8¾)
17J ..... $ 5.00
7J ..... $ 3.75
AS 984-1002 (10½)
17J ..... $ 5.00
7J ..... $ 3.50
AS 1194 (10½-11½)
17J Sweep ..... $ 5.00
7J ..... $ 4.00
10½L Movements ..... $3.00 up
3¾ baguette (FFI-59)
17J ..... $ 7.00
5-5½-6 ligne oval
15-17J ..... $ 5.00
6½L oval
15-17J ..... $ 4.00
6¾ tonneau
15-17J ..... $ 4.00
6¾ round (AS 969 etc.) 17J $10.00
7x11 (ETA 735) 17J ..... $ 6.00

HAMILTON

12 size—17J $10.50
16 size—17J $10.00
6/0 (987F etc.) 17J $10.00
14/0 (980) 17J $10.00
18 size open face 17J ..... $ 7.50

BULOVA

6AM-6AH 17J (FF120) $10.00
3AF-AL-AN (3¾) baguette
15-17J $10.00
5AP (5½ oval)
15J, $7.50; 17J ..... $ 8.00
6AP (6½ oval)
15J, $8.50; 17J ..... $ 8.00
6AE-6AF (oval tonneau)
15J, $6.50; 17J ..... $ 8.00
7AM (7¾ round)
17J ..... $ 8.00
8AH 17J $10.00

13AF 15-17J $10.00
5AB (AS 1012)
17J $12.00
7AP
17J $10.00
21J $14.00
10AN-10AX-10AK
15J ..... $ 7.50
17J $10.00
10BS-BC
15J, $7.50; 17J ..... $ 9.00

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405-406 (with case) $10.00
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0 or 3/0 Size ..... WAL $ 4.00
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15J...EL $5.00 ..... WAL $ 4.00
8/0 Size—15J ..... $ 7.50
17J $10.00
10/0 Size
15J.....EL $7.00 ..... WAL $ 6.00
18/0 Size
7J ..... $ 5.00
15J ..... $ 7.00
21/0 Size
7J ..... $ 6.00
15J ..... $ 8.00
26/0 (3¾ L) ELGIN $10.00
12 Size Elgin: 7J, $4.00; 15J, $5.50; 17J, $7.00
16 Size Elgin: 7J, $5.00; 15J, $6.50; 17J S.R., $7.00; D. R., $10.00.
12 & 16 Size Waltham:
7J, $3.50; 15J, $5.00; 17J $6.00
18 Size—21 Jewels
Open Face, HAMILTON, WALTHAM, ILLINOIS, ELGIN $10.00

WALTHAM ONLY

670-17J ..... $ 8.00
870-9J ..... $ 6.00
17J ..... $ 8.00
7¼ ligne (750) 17J ..... $ 8.00
400 (baguette) or 450 17J $10.00

ALSO: CHRONOGRAPH AND SELF-WINDING MOVEMENTS

NEW 17-JEWEL MOVEMENTS

FF 120 (6x8) ..... $ 9.00
AS 976 (5L) $10.50
AS 970 (8¾L) ..... $ 8.50
3¾ ligne Baguette-FF 59 (Replaces Bulova 3AL-AN-AB) $17.50
5 ligne Peseux 140 (Replaces Girard Perregaux 52 Concord, etc.) $12.50
5½ ligne AS 1012 (Replaces Bulova 5AB-Wittnauer 5W-Benrus AE) $13.00
6¾ ligne Round—AS 969 (Replaces Bulova 6 AL) $17.50
7¾ ligne Round—(Replaces Bulova 7AM—Benrus AP—Gruen, etc.) $12.50
6 ligne Round Felsa $22.50

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We carry a complete list of materials, tools, findings, watches and attachments.

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145 Canal Street • New York, N. Y.

The American horologist and jeweler

Incorporating Horology

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presents a Better Oil . . .

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Here is the oil fine watchmakers have sought for generations. PML 79 Oil, product of more than ten years' intensive development in the Hamilton Research Laboratories, embodies *all* of the lasting characteristics essential to continued and accurate performance of fine watches of all sizes.

Extensive laboratory, factory and field tests have preceded the release of PML 79 Oil to the watchmaking trade. These tests indicate that Hamilton PML 79 Oil and only PML 79 Oil offers all of these essential qualities.

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Watchmaker's Art!

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Genuine PM Staffs are available for over 5,000 Swiss and American watches. If you haven't already discovered the superior quality of PM Staffs, send your jobber a trial order today.

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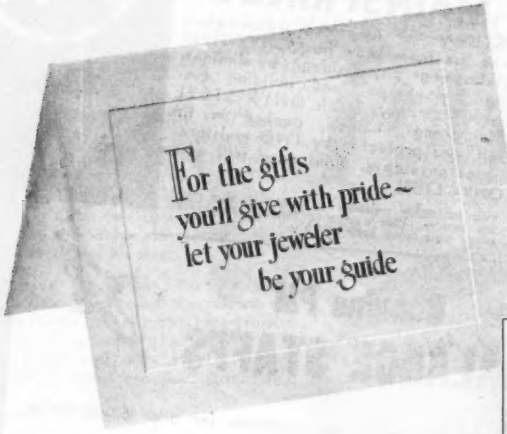
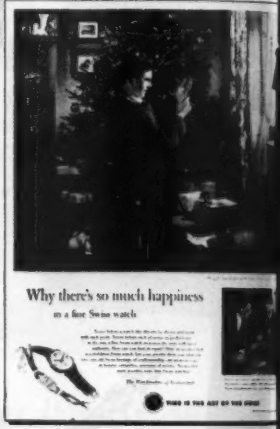
NOVEMBER NEWS FROM THATC



IT'S THE TRADE'S STRONGEST SLOGAN—

BUT...

Quality Jewelers must COMPETE to make The Watchmakers of Switzerland campaign pay off



THIS YEAR, shoppers have the widest gift selection in history. And while Quality Jewelers offer America's most wanted gift, the fine Swiss watch, they must fight for traffic—and earn every sale!

That means active local tie-ins with The Watchmakers of Switzerland national campaign. It means taking the final step that converts a pre-sold shopper into a well-sold *sale* in your store.

AND DISPLAY'S THE THING to help you sell UP. You can easily build a telling, *selling* display of your quality Swiss watches around our December advertisement (right). It appears in LIFE, LOOK, SATURDAY EVENING POST and FARM JOURNAL—or you may prefer to use the December page in our full-color "Preview" brochure which you received earlier this year.

SELLING UP MEANS SELLING BETTER: better merchandise and better profits. You'll find customers respond better, too, when you give them the many reasons why the fine Swiss watch is truly "the perfect gift"—both to give and to receive.

The WATCHMAKERS OF SWITZERLAND

WATCHMAKERS OF SWITZERLAND

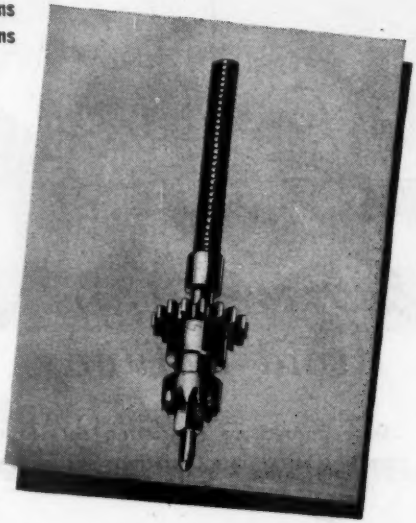
Why genuine watch parts mean more satisfied customers—and more repair profits

Winding stem is example: only GENUINE stems come to you factory-perfect in ALL dimensions

HERE IS A TYPICAL WINDING STEM, with clutch and winding wheels. As you know from experience, if a replacement stem is not *Genuine*—that is, if any of its many precise dimensions are improperly sized—your customer is in for trouble the minute he winds his watch!

THAT IS WHY WE SUGGEST so strongly that you specify *Genuine* replacement parts. For only Genuine Swiss repair parts are made to exact factory specifications. In fact, they are made according to the very same blueprints as the original movement itself—and made with the very same quality steel.

THUS, to take the example of a Genuine stem, it always has clean-cut threads, with hub perfectly sized to fit snugly in the stem hole of the plate. And the perfection of the stem square—which fits the clutch wheel core with micrometric accuracy, permits the smoothest possible meshing of the clutch wheel, winding wheel, and setting wheel.



RESULT? With *Genuine* Swiss watch repair parts, you are *sure* of a perfect fit. And as you know from experience, that means 100% customer satisfaction!

THE FINAL STEP in assuring factory-perfect accuracy in *Genuine* Swiss repair parts is packaging. This assortment of stems, staffs, barrel arbors and other parts shows the bright, metallic containers that identify *Genuine* parts, and protect them in transit. So it's no wonder that the Watch Material Distributors Association is pledged to supply you with Genuine Swiss materials—the one *sure* way for you to get parts that really fit!

ALWAYS SPECIFY GENUINE SWISS REPAIR PARTS FOR PERFECT FIT

Engraved Gifts Avoid Refunds

Give immediate engraving service right up to closing time Christmas eve with your

Engravograph

The *modern* tracer-guided engraver. So simple anyone can operate it. Buy one and pay out of profits.

Send for booklet
"How to Make Money with Tracer-Guided Engraving"

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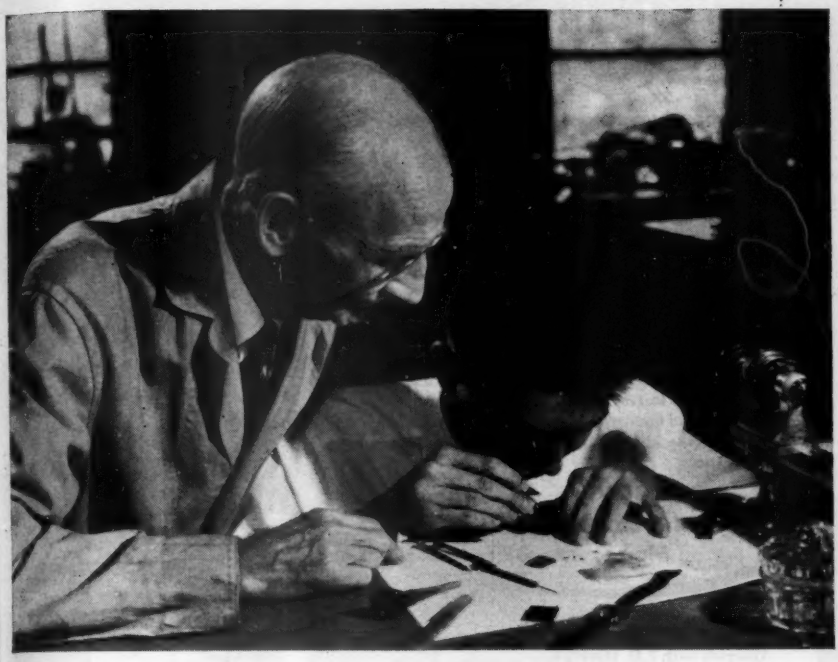

Korean Vets Now Eligible—

Learn Watchmaking at America's Leading School

Elgin now offers its complete watchmaking course to veterans of the Korean War under G.I. Bill of Rights privileges.

At Elgin you learn under practical conditions, supervised by the dean of American Watchmakers, W. H. Samelius. And the complete course includes watch selling and the management of the jewelry store.

In just the time that it takes to *fill in, tear out,* and *mail* the attached coupon—you can assure yourself all the information that will make you a financially independent craftsman for life. Why not do it now?

ELGIN WATCHMAKERS COLLEGE, Box 201
207 South Grove Avenue, Elgin, Illinois

Gentlemen:
Kindly send me full information about your course in watchmaking.

Name _____ (Please Print Name and Address)

Address _____

City _____ Zone _____ State _____

I.d.

NOT merely water-tight... NOT merely water-resistant... BUT...

WATERPROOF

AMERICAN-MADE WATCH CASES

(Remains WATERPROOF as long as crystal is intact, back is properly put on and gasket is unimpaired)

I.D. again makes watch case history with a new *improved* waterproof watch case. Enthusiastically approved by largest American movement manufacturers and importers. Easy to assemble. Can be made to take all types of movements, including automatic.

Hydraulic Compression Makes the Difference!

HYDRAULIC COMPRESSION is *exclusive* in America with I.D. Here's how it works: While *back remains stationary*, slotted retaining ring rotates on flange, compressing the flange against neoprene gasket in channel of bezel. This eliminates the bunching up and flaking of gasket which commonly causes loss of waterproof qualities in the old-style screw-back type of case. No need to use a wrench or vise to tighten the new I.D. case. *Hand-tightening* is sufficient to keep it waterproof.

1. **BEZEL:** highly styled, precision-made. 2. **MOVEMENT HOLDER:** Prongs hold movement tight against reflector, acting as shock absorber, and eliminating jarring. 3. **GASKET** of Neoprene; impervious to acids, water, oil, grease, etc. 4. **FLANGE BACK** stamped from stainless steel, with precision-machined finish. 5. **RETAINING RING** (stainless steel). Slotted for key. Precision-machined threads. 6. **KEY** of hardened steel, fine finish. With fibre pad that keeps key from slipping and scratching back.

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EASTERN AND CANADIAN REPRESENTATIVE: Dave Kay, 93 Nassau Street, New York, N. Y.
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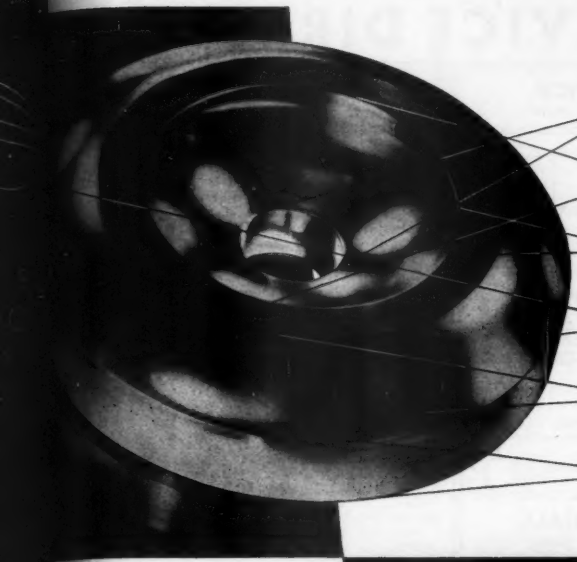
WATERPROOF

by leading independent laboratory

Scientists in a famous independent testing laboratory (name on request) subjected the new improved Series "C" I.D. Waterproof Watch Cases (as they leave the factory) to the most exacting and critical tests and certified these cases to be *waterproof*.



1 HOLE round, straight, polished, precise diameter

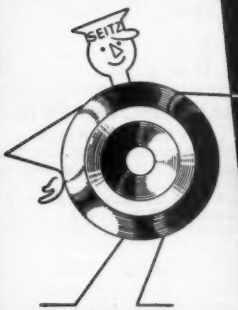
2 OIL CUP well polished

3 UPPER FACE flat and regular

4 DIAMETER accurate to ½ hundredth of mm.

5 BEVEL convex and polished

6 RIM of uniform height



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There is only one packing. Reproduction of this packing.

Why does the repairer choose SEITZ jewels? Because SEITZ jewels for repairs are exactly the same as those supplied to watch manufacturers.

ASK YOUR SUPPLIER FOR

THE REPAIR JEWEL

Sole Agent for All Countries Bergeon & Cie. Le Locle (Switzerland)

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Seitz

B-M-S SERVICE DIRECTORY

* COMPLETE STAFF SERVICE

"$1.00 Service Charge On These Items"

Staffs made to order from sample only	$ .50
Staffs with high grade finish	1.50
Cylinders	2.50
Staffs made and set into balance, and balance trued. Send sample staff, wheel and roller only	1.50
Cylinders	3.50
French Clock Platforms	$3.50 up

* BEZELS MATCHED & MADE

"$1.00 Service Charge On These Items"

(Prices include free round unbreakable crystal)

Round Bezels made-to-order for Chronographs, etc.—	
White	$5.50
Yellow	7.50
Bezels matched to hunting case, average	1.50
Bezels matched to 3-piece filled cases, average	1.75

EVERY BEZEL FITTED AND TIGHTENED BEFORE SHIPMENT. BACKS MATCHED & MADE.

* BRAND NEW ENAMEL DIALS

"$1.00 Service Charge On These Items"

For 16 size Hamilton 4-foot	$5.00
For 16 size Illinois Bunn Special	5.00
For 12 size Illinois	3.50
For 18 size Hamilton O.F.	5.00

Send Sample for Any Other Dial Needed

* ORIGINAL ENAMEL DIALS

$1.00 Service Charge On These Items

We can supply dials in perfect condition from used movements . . . sizes 10/0 to 18. Send old dial or sketch of feet and position of "12"—**$1.00** up.

* WHEELS & PINIONS

"$1.00 Service Charge On These Items"

Repivoted	$ 2.50 up
Teeth Repaired, first tooth	1.25
Additional, each	1.00
Barrels, per tooth	1.50
New Pinions made by hand	$5.00, $7.50, 10.00

*FOR SALE—MATERIALS—NEW

No Service Charge

Staffs for Swiss Watches, doz.	$1.40
Staffs for American Watches, doz.	1.50
Stems, Swiss or American, doz.	.50
Crowns, Bracelet, 1/10-10 Yellow, doz.	.75
Crowns, dustproof, doz.	1.50
Crowns, waterproof, doz.	1.50
Complete Blances, Breguet for all Gruen and Bulova, ea.	2.50
Complete Balances, Flat for all Swiss, ea.	1.75

* MOVEMENT FITTING SERVICE

"$1.00 Service Charge On These Items"

We rebuild old-fashioned diamond cases from the inside to accommodate new 5L 17J movements. We supply the movement, matching dial and crown. We rhodium plate and refinish the case.

Your total cost	$25.00
Thin model cases	30.00

* FOR SALE - MOVEMENTS - USED

"$1.00 Service Charge On These Items"

Our movements are hand-picked, GUARANTEED perfect for replacement. All they need is cleaning. We will replace any defective part free, or, if you are not satisfied with our movement we will exchange it or give you a full cash refund.

FF 120 (6xS) 17J	$ 5.00
7J	3.75
AS 970 (8¾) 17J	5.00
7J	3.75
AS 976 (5L) 17J	6.75
AS 1194 17J (Specify 10½ or 11½)	5.00
7J	3.25
Gruen, Wrist or Pocket—	
Any 15J Model	9.00
Any 17J Model	10.00
Elgin-Waltham—	
0 or 3/0 Size	
15J EL $6.50	WAL
12 & 16 Size	
7J EL $5.00	WAL
15J EL $7.00	WAL
17J EL $9.00	WAL

FOR SALE - MOVEMENTS - NEW

NO SERVICE CHARGE

3¾ ligne Baguette-FF 59 (Replaces Bulova 3AL-AN-AB)	$15.
5½ ligne AS 1012 (Replaces Bulova 5 AB-Wittnauer 5W-Benrus AE)	16.0
6¾ ligne Round—AS 969 (Replaces Bulova 6 AL)	13.75
FF 120 (6x8)	10.00
AS 976 (5L)	12.50
AS 970 (8¾L)	10.00

* FOR SALE - RAILROAD WATCHES

"$1.00 Service Charge On These Items"

Prices Include Movement, Original Dial, G.F. RR Case

Movements have shiny plates in perfect condition, need only a cleaning to make them good as new. Each case refinished like new.

21J Hamilton 992	$22.50
21J Hamilton 992-B	35.0
21J Elgin-late durapower Model	31.00
21J Elgin-B. W. Raymond	26.00
RR Movement Only—Deduct	5.00

Write for our circular containing a complete listing of new and used movements, as well as full description of our wide range of watch and clock services and material.

Bonded Messenger Service

P. O. Box 13 **White Plains, N. Y.**

The American horologist and jeweler Incorporating Horology

Volume 19 November, 1952 No. 11

THE BALANCE SPRING

A Prize Essay by Moritz Immisch

THE Balance Spring has often been called the soul of portable time-measuring instruments, and anyone at all partial to figurative language will own that it fully deserves the appellation, inasmuch as from its importance, delicacy, sensitiveness, and independence of action, it may well be likened to the predominating Mind, which, though it derives its sustenance from the Body, governs in its turn all the actions of the latter. Watchmakers are all the more tempted to make a comparison of this kind on account of the uncertainty under which the majority of them labour with regard to its properties and the laws which govern its actions.

One can scarcely be surprised at the prevailing ignorance in this respect, as there is very little reliable information to be found in books on watchmaking which could at all serve as a guide, and as a sound base for self-improvement.

The principal aim of watchmaking is correct measurement of time, and it must be confessed that in this respect, judging from the average performance of what are called first-class watches, there is ample room for improvement. There is no doubt that a proper knowledge of the nature and correct adjustment of the balance spring, especially with regard to isochronism, is of the utmost importance.

This manifests itself very strikingly, when we see that frequently a watch or chronometer of inferior make and even faulty construction goes admirably, and with a regularity which in some cases is perfectly astonishing; while, on the other hand, the highest degree of perfection of the escapement, the most exquisite finish of the trainwork, is unavailing to produce good performance if the balance spring is

It's interesting to note when reading Moritz Immisch's work that when we study, experiment and develop theories on hairsprings and their effect on the rate of a watch, we are merely re-discovering the theories worked out by watchmakers many years ago.

Immisch's paper, which was a prize-winning effort in his day (1872) shows a remarkable similarity to the writings of Theo. Gribi, Rawlings, Grossman and other authors of modern times and many years ago.

It is a re-stating in a different and interesting way of the laws by which we are governed when adjusting watches—those laws discovered and recorded by Robert Hooke in the middle 1600s.

James L. Hamilton,
Author, "Timing Manipulations"

WAKMANN WATCH WAYS

The Man Who Learned All About Life

By Icko Wakmann

There was once a man who had 3 wives. His time schedule was complicated, but he managed! Thus, not one knew about the others, until a fateful day when they met at a gathering. Then turmoil broke out! The whole city boiled; the man was summoned before the High Tribunal, and a jury was called to hear the case.

For days, the jury sought a sufficiently heavy penalty. Finally, it decreed the man must live with all 3 wives in one house! Still the city boiled. No one was satisfied. But a week later, the man came running to the High Tribunal. "Jail me, shoot me," he pleaded, "do anything you will with me—but I **cannot** live with 3 wives!"

Our much-married friend learned about life the hard way. Many jewelers are learning watch merchandising the hard way, too. They jump from one line to another. Here they look for waterproofs, there they buy automatics, somewhere else other types of watches. They make life complicated for themselves!

Consider, dear reader, the difference when you do business with Wakmann. From **one** source, you get outstandingly, profitable styles—dependable waterproofs and automatics for men and women, sensational calendar watches and chronographs, exceptional dress and sport watches. What you need, you **get**—from Wakmann.

Today, write to me. I will personally see to it that you receive full information. If you wish, a Wakmann salesman will visit you and show you these **beautiful** watches. Or, if you prefer, I will send you the famous Wakmann catalog, the "$20,000 Show Case". Either way, you will have no obligation—but you will find out something that can be **very profitable to you.**

Icko Wakmann

15 Jk. 17 Jk. 21 Jk.

"The Only Incabloc Watch With the One Year Repair Policy"

faulty or imperfectly adjusted.

It is to the introduction of the balance spring that watchmaking as an art may be said to owe its very existence.

There certainly was a kind of watch made before its invention in which the vibration of the balance was kept up by the recoil it met with in the escapement, the momentum of the balance being alternately destroyed and renewed solely by the direct operation of the motive force. This mode of obtaining a vibrating motion was no doubt extremely ingenious, but it is evident that any of the unavoidable irregularities to which the available impelling force of the fly-wheel is always subject would tell immensely upon the balance, modifying its speed to such an extent as to make these watches next to useless for practical purposes. The principles upon which these machines were constructed, precluded the possibility of their being materially improved, and they would have remained, what in fact they were then, objects of curiosity rather than of utility.

It was reserved to the genius of the celebrated Dr. Hooke, who in the middle of the seventeenth century discovered the use of the balance spring, to supply the wanting elements of perfectibility, and to raise watchmaking from its primitive state to the rank of a beautiful and beneficial science.

His keen intellect perceived at once the immense advantage of giving to the balance an independent motion of its own, by means of which it was enabled to exercise a proper control over the irregularities of the motive force and to neutralize their effects. His scientific investigations of the nature of springs, and his inquiries into the laws that govern their action, led him to his celebrated maxim, "ut tensio sic vis" (the force of a spring is as its tension), that has made his name famous forever. With a view to solve the problem of determining the longitude at sea by means of a correct timekeeper, he applied for a patent; it was not carried into effect, however, on account of a serious disagreement between him and some enterprising gentlemen of position, in conjunction with whom the Doctor intended to work the

patent at first, and he determined to leave the matter dormant for a time. It soon transpired, however, and "pendule watches" were made by several watchmakers in London soon afterwards. We find, too, that later on, several French watchmakers were quarrelling amongst themselves about the priority of the same invention, but this can only mean the priority of application, inasmuch as from documents still existing it appears that some of them had been in communication with the same parties who had failed to come to terms with Dr. Hooke, and it is more than probable that they suggested the idea to their French correspondents.

Considering time and circumstances, the beautiful combination of balance and spring must be put solely to the credit of Dr. Hooke.

Applied to the old verge escapement, the difficulties in the way of good performance were still very great on account of the recoil; but as this could now be dispensed with as a means of bringing the balance after a first impulse back into a proper position to receive the next, the idea of dead-beat escapements suggested itself, and Hooke contrived one which, though it had still a slight recoil, contained the elements and was suggestive of the duplex escapement which was invented some fifty years later by Dutertre, a French watchmaker.

In the course of time a good many of these escapements came into existence, but it was not until the free detached escapements made their appearance in the latter part of the eighteenth century, that the real properties of the balance spring could at all be tested with any chance of arriving at some definite conclusions.

Before that time the greater or lesser friction of the acting parts of the escapements continuing throughout the whole of the vibration made it a matter of great perplexity to reconcile the results actually observed with Hooke's "ut tensio sic vis," and as the theories founded on experiments with one escapement were at variance with the results of experiments made with another, we cannot wonder that the opinions concerning the spring were undecided and sometimes contradictory.

As an instance illustrative of the extreme difficulties in the way of properly understanding the conditions under which the balance spring acted, I may mention that in 1766, more than a hundred years after Hooke's invention, Cumming, in his book "Improvements of Watchwork," describes a dead-beat escapement, and in experimenting with it finds that its behaviour in long and short vibrations was so different to what it was with other escapements that he comes to the conclusion "that hitherto the effects of the maintaining power have been mistaken for the natural tendency of the pendulum spring."

The detached escapements, as they were invented and gradually improved, reduced the friction, that great enemy to steady motion, to a minimum. The emancipation of the balance and spring from the influence of the maintaining power permitted the conditions of their motion and their relation to each other to be considered as separate features; by means of inferences the remaining friction in the escapement became a known quantity with determinable limits, which could, by turning the acquired knowledge of the properties of the spring to a proper account, be successfully contended with; and what was before quite illusory—the realization of the much cherished idea of determining the longitude by means of a watch—became now more feasible. We see watchmakers of that period exerting their utmost skill to attain that end, the large reward connected with it no doubt acting as a powerful stimulant to their energies.

The spirit of controversy being aroused, various and sometimes contradictory theories were advanced in books and pamphlets. The principal aim still seemed to be the further perfection of the escapement, and it makes one sad to think that so much incessant labour should have been thrown away without directly furthering the end in view; as, for instance, in the case of Mudge, who constructed a remontoir escapement so bold and original in conception as to find, simply considered in the light of an ingenious mechanical contrivance, scarcely a parallel in the whole history of watchmaking.

This memorable period of competition

was, notwithstanding the frequent mistakes, productive of results extremely salutary to the advancement of horology as a science. Failures of some artists served as examples not to be followed, marking a path to be avoided, and inducing others to look for success in other directions.

The detent escapement being almost exclusively adopted for chronometers, as combining the least friction with the greatest simplicity, the balance spring now received a greater share of attention than heretofore.

Up to the time of Arnold, balance springs were made in the flat spiral shape. With him originated the cylindrical helical spring. The ends of this spring are bent inwards, forming a curve, within the circular space of the coils; the greater or lesser abruptness of these curves affects greatly the action of the spring in long and short vibrations, and is therefore determinable by the exigencies of each case.

Somewhat later the Breguet spring made its appearance, deriving its appellation from its inventor. The body of this spring is flat, but the outer coil is bent upwards with a gentle sweep; at some distance from the flat part of the spring it again forms a knee downwards, in order to bring its length parallel to the plane of the spring; from there it is bent inwards, forming a curve gradually tending towards the centre, similar to that formed by the ends of the helical spring.

I have to mention another spring, which, on account of its form when seen sideways, is called the spherical spring. It was invented by Houriet, a Swiss watchmaker. While in the cylindrical helical spring all the coils, except the curved ends, are of equal diameter, the diameters of all the coils of a spherical spring are different from one another, being largest in the middle and lessening towards the ends.

The specific advantages and disadvantages of these different forms of springs will hereafter be gone into.

I may here mention that the cylindrical form has, with very few exceptions, been adopted by English makers for marine and pocket chronometers, and the high reputation of superiority the English chronometer enjoys, and always has enjoyed, speaks volumes in its favour. One of the principal advantages afforded by this form of spring consists in the facility with which it permits those manipulations to be performed which are necessary to enable the spring so to control the motion of the balance that the long and short vibrations are performed in equal times.

This state of uniformity is called isochronism. We find that it is practically impossible to procure equal arcs of vibration for any length of time; the gradual increase of friction on account of the thickening of the oil will soon make the vibrations fall off, and in the case of pocket watches, the motion imparted to the balance while being carried and the varying friction in different positions cause a considerable fluctuation in the length of the arcs; and as, in order to obtain a steady rate of going, any given number of vibrations, whether long or short, must be performed in a given time, it is evident that isochronism is the most important feature connected with balance springs.

A good deal has been said and written on isochronism, and where these writings have confined themselves to the practical side of the question in promulgating the results of experiments, describing the manner of procedure, the means by which isochronism can actually be obtained, they have no doubt done a great deal of good, but all endeavours to create a sound comprehensible basis for the various phenomena exhibited by different springs have proved more or less unsatisfactory.

There are those who are not satisfied simply to know what is to be done to procure isochronism, but are desirous to learn upon what principles these manipulations are based, *why* a change of form should procure isochronism, and why did it not exist before the change; and upon this important point it must be confessed that general knowledge is certainly deficient, not only amongst watchmakers, properly so called, but also amongst a considerable portion of those who have made springing and timing their specialty. Isochronism is a very intricate and complex topic in itself, but the difficulties in

the way of mastering the subject have certainly been increased by the manner in which some writers have treated it.

When an opinion assumes the form of an authoritative dictum, without being based upon, and borne out by, unmistakable facts, it is very apt to mislead the student, waste his energies, and to discourage further investigations.

One of these so-called principles is the prevailing idea that isochronism solely depended upon a certain length of the spring; that too short a spring made the small vibrations slower than the long, and too long a one caused the watch to lose in long vibrations. This is so far from being correct, that sometimes in the case of a very long flat spring, it is a matter of the greatest difficulty to make the long vibrations slow enough to arrive at isochronism, while a shorter spring offers more scope for any manipulation tending to that end. Everyone with some experience in timing, knows that mere length has absolutely nothing to do with isochronism, and if, nevertheless, we frequently meet with this assertion in books on watchmaking, it proves that it was simply copied from other books, without having been tested by the writer.

Another very general idea is that isochronism is an inherent property of the balance spring. This is also incorrect, and to assume that, because by means of the spring isochronism can be arrived at, the conditions constituting isochronism must be looked for in the spring, is not quite but nearly as wrong as if anybody was to assert that, because licorice cures cough, the conditions constituting cough must be looked for in the licorice.

I have already mentioned the difficulties Cumming, nearly 100 years before this writing, experienced in accounting for the different performance of springs when in connection with different escapements, and the very natural and sensible conclusion he came to; and although escapements of the present day are far superior to those of that time, there still exists sufficient difference between them to make it a matter quite out of question, for instance, that a balance and spring perfectly isochronous while attached to a chronometer should retain this quality when attached to a lever escapement, unless it was by merest chance, *viz.* if the chronometer was badly constructed and the lever escapement in a state of perfection, the difference being so proportioned as to make the sum of friction in the one amount exactly to that in the other.

Otherwise, and under ordinary circumstances, the balance spring perfectly isochronous in the chronometer would be sure to perform the long vibrations quicker than the short ones in the lever watch; but it is not at all necessary to bring the balance spring in connection with different escapements in order to prove that the resistance in the escapement modifies the isochronal conditions, as carefully conducted experiments with one and the same escapement will show that every increase and decrease of friction affects the motion of the balance in long or short vibrations more or less sensibly.

A still greater factor in this respect is the balance itself; and before I consider it in its relation to isochronism, I think it advisable to make some general remarks concerning it.

When a balance without a spring is brought into connection with a chronometer escapement and turned in the direction of unlocking, the escapement will cause it to revolve round its axis. There is first of all a certain amount of force required to overcome the inertia appertaining to all bodies at rest; *this is a dead loss,* and irrelevant as this may seem to many who have applied themselves to the study of the laws of isochronism, there will also be those who, by inference and actual observation, have found that great importance attaches to this point, and that it bears directly upon the subject of isochronism, as will appear hereafter.

The impulse given, the balance revolves round its axis with a speed greater or less according to the greater or smaller proportion the propelling power bears to the resistance to be overcome; after a whole revolution it presents itself to another impulse, and arrives at this point with a velocity somewhat less than that with which it started, the loss arising from the friction of the pivots, the resistance of the

air, and the unlocking of the escapement. To this velocity another impulse is added, which causes the second revolution to complete itself much quicker than the first; the diminution of the speed caused by the retarding influences already mentioned, is now much less apparent, as the greater momentum acquired by the balance enables it to overcome them easier, and soon the balance acquires so much force of its own as to leave no perceptible trace of lessening of speed between the commencement and the end of each revolution. This is, however, under the presupposition that the balance is of some considerable weight and diameter: different balances will behave very differently in this respect; a more substantial one has a greater capacity for retaining and accumulating any force transmitted to it, and will consequently exercise a greater controlling power over the impediments in the way of uniform motion.

In all cases, as impulse is added to impulse, the velocity will go on increasing until a maximum is reached, where the speed remains stationary. After what has already been said, it is evident that a slighter balance, owing to its more yielding nature, will arrive at this point of uniformity sooner than a more substantial one; but irrespective of the time required by different balances to arrive at this maximum state of velocity, that state itself is determined not only by the sum of the various influences already mentioned, but also by the inertia of the escape wheel and train, which has first to be overcome by the motive force, causing a loss of time.

This loss is of no importance when the motion of the balance is slow, as the acting tooth of the escape wheel will then come in contact with the pallet as soon as the latter has fairly entered the circle of the former, and the balance receives the full benefit of the impulse as it is acted upon through the greatest possible arc; but as the velocity of the balance increases the pallet will enter the circle of the escape wheel quicker and will have proceeded farther in it before the sluggishness of the escape wheel and train has been overcome, and in proportion as the "drop" increases, the effectiveness of the impulse decreases, until at length it is counterbalanced by the above-mentioned retarding influences, and the motion remains stationary. It may be as well to mention here that in the case of maximum speed, the resistance of the air is a more important retarding agent than when the motion is slower, as it increases in the ratio of the squares of the velocity.

All these conditions determining the limits of the various influences acting upon the simple motion of a balance, remain in full force when this balance is connected with a spring. In the case of a *vibrating* balance the number of these conditions is naturally augmented by circumstances originating with, and various properties appertaining to, the spring.

When any external pressure is brought to bear upon a spring, changing its form in any direction whatever, this change invariably implies a shifting, a displacement of the relative position of the infinitely minute atoms composing it.

The spring contracts on the side towards which it is bent, compressing the particles of the material into a smaller compass, and expands on the other; the particles in the centre of the spring only retaining their relative positions. Within certain limits this displacement is only temporary; the pressure ceasing to act, the cohesive power of particles causes them to reoccupy their original relative positions exactly, so that no trace is left of any change of form. If these limits are overstepped, they will only partly reoccupy their former position, and a permanent change of form is effected. It stands to reason that the greater or less thickness of the spring greatly modifies these limits. If a thin spring is bent to a certain angle the extreme contraction and expansion of the particles farthest from the centre will be less than when a thick spring is bent to the same angle of inflection.

These limits are also modified by the degree of hardness possessed by different springs; being smaller with softer and greater with harder springs. The force with which the spring returns to or towards its original shape, after having been forced out of it, is called the free elastic force. This free elastic force is in all cases somewhat less than the force em-

ployed in its tension, or, what is the same thing, somewhat less than the resistance which the spring opposed to the bending force.

The more the minute corpuscles composing the spring have to be displaced, in order to bend it, the greater this loss will appear.

If a balance is connected with a spring, it strikes us at once that the spring enters the list of those influences which are opposed to the motion of the balance, and it appears here as a very powerful factor, inasmuch as the effect of a single impulse, or the sum of a certain number of consecutive impulses, is much sooner absorbed with it than without it. If there was no impulse power absorbed in bending and unbending, if the recoiling force of the spring amounted exactly to the force employed for tension, a sprung balance would vibrate just as long as the same force would cause it to revolve round its axis, subject however to this qualification, that by the action of the spring the side pressure on the pivots is somewhat increased, which certainly assists to bring a vibrating balance sooner to a standstill; but this influence of increased friction, important as it is in other respects, bears only a small proportion to the loss occasioned by the change in the granular condition, which may be imagined as a kind of friction within the spring itself. This loss of force also varies slightly with the degree of hardness; being greater in softer, and smaller in harder springs. The force so lost to motion seems to be active in destroying the elasticity of the spring. In very thick and soft springs this diminution is so rapid that sometimes a few years' use will cause such a difference of elastic force as to necessitate the respringing of the instrument.

A vibrating balance has many points in common with the pendulum of a clock. As a pendulum gradually increases its arc of oscillation till it has accumulated all the force the motive power can impart, and till it is counterbalanced by the force of gravity which also accumulates, so do the vibrations of a balance increase till its acquired momentum is counterbalanced by the resistance which the tension of the spring opposes to a further increase of gyration. Although the force of gravity which causes the pendulum to continue its oscillation is of uniform intensity throughout, while the force of the balance spring differs in all points of the vibration, this dissimilarity does not prevent the two respective motions from being considered as identical in this respect, inasmuch as the *sum of force* in a spring coincides with that which actuates the pendulum.

Both pendulum and balance perform their respective vibrations in the same time, whether the arcs are large or small; in both cases, therefore, the velocities increase with the angle of inflection, and the resisting are proportionate to the impelling forces. This may be thus expressed: let line A, B (Fig. 1) represent

Fig. 1

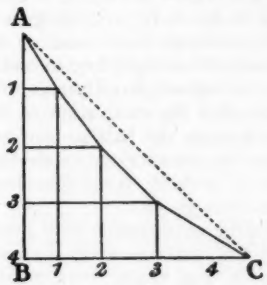
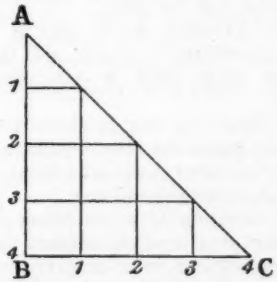


Fig. 2

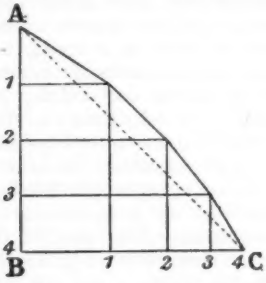


the momentum, and line B, C the force of gravity; divide these lines into equal parts and draw rectangular lines till the corresponding ones meet; if we now connect these points of juncture we obtain the straight line A, C.

In the case of a balance the momentum is also uniform, A, B (Fig. 2), but the resistance B, C is uneven throughout, being weakest at the beginning and strongest at the end of the vibration; by connecting the points as in Fig. 1 we get the curve A, C; but as the force has been

increasing with the resistance, the return of the balance to the point it started from must now be expressed as in Fig. 3, the force being greatest in the beginning and

Fig. 3



smallest at the end; proceeding as before, we get the curve A, C, and as the distances from the straight line in both curves exactly correspond in all points, it is evident that after the completion of this part of the vibration the balance will arrive at the point it started from, with the same velocity as if both the forces had been uniform throughout.

In making experiments with pendulums we find that without some auxiliary contrivance the long arcs are performed slower somewhat than the short.

This difference in the arcs is double when the weight is double, and the same increase takes place if the velocity is double.

It follows that they originate with, and are determined by, the weight and the velocity, or, what is the same thing, by the momentum of the pendulum.

The vibrating of a pendulum may be imagined as a struggle between the momentum and the force of gravity; at the end of each vibration when the gravity succeeds in overcoming the momentum there is a point of rest. If in the same moment this point is reached, the gravity should cease to act, the pendulum would remain in this position; as it is, there will be a certain amount of force required to overcome the inertia appertaining to all bodies at rest. This force so lost to motion is tantamount to a loss of time, as we have seen above in the case of the escape wheel and a rotating balance. It naturally follows that this state of rest will be prolonged by an increase and shortened by a diminution of weight. It also stands to reason that in the case of equal weights a greater velocity will put the force of gravity, which remains the same, to a disadvantage, the struggle will be prolonged, which also causes a retardation. The scientific explanation of this is to be looked for in fact, that the point of percussion in a swinging body does not coincide with the point of gravity.

In assisting the force of gravity by applying a suspension spring, these irregularities can be contended with; as its force is as its tension, it will be greater at long than in short arcs; and if it is of proper length and thickness, and its force in proper proportion to the weight of the pendulum, it will cause the long and short vibrations to complete themselves in the same time; but, although by means of a suspension spring, isochronism can be obtained, it is far from being the sole agent in this respect, because if the weight is diminished the long vibrations will gain on the short ones and *vice versa;* and again, if the weight be the same and the length diminished, the long will be slower than the short arcs; so that when the strength of spring and the number of vibrations are given, a certain weight will cause the vibrations to be equal; if strength of spring and weight are given, a certain length will be required for that purpose. In making experiments with pendulums the influence of the resisting air must be taken into account. This resistance, as stated above, increases in the ratio of the squares of the velocity, and inasmuch as it assists the force of gravity to overcome the momentum, it has a tendency of quickening the long vibrations. Experiments will show that with a very light pendulum presenting a very large friction surface to the air, the long vibrations are performed even quicker than the short; so that isochronism may be arrived at by a proper proportion between the weight and the friction surface of the pendulum; however, no watchmaker would think of resorting to this means, as such a pendulum would require a much greater force to be moved through the required arc. I simply mention this as a circumstance bearing on the subject which must not be lost sight of in making experiments. Care must also be taken that the oscillation should con-

tinue in the same plane; if they are in the slightest degree elliptic the point of rest is not perfect, and the result unsatisfactory.

The knowledge and proper appreciation of these influences in connection with the vibrations of a pendulum will materially assist us in comprehending the elements of isochronism in balance and spring. Here we must substitute the *extremities* of the balance spring for the suspension spring of a pendulum, and the relative force of the balance spring for the force of gravity. This relative force increases and decreases inversely with the weight and the squares of the diameter of the balance; any change, therefore, in the dimensions of the balance involves a change of this relative force, which stands here in the place of the force of gravity acting on the pendulum, and which is uniform. If there existed several forces of gravity of different intensities which could be brought to act on a pendulum, the latter would require a different isochronal adjustment for each of these. In the case of a more powerful force, causing quicker vibrations, the momentum would be at a disadvantage, the suspension spring would have to be weakened, or the weight increased. In a watch calculated for quick vibrations the balance is at a similar disadvantage, and experience proves that when the vibrations are very quick, watchmakers have sometimes the greatest difficulty in making the large vibrations slow enough to counteract the effect of the escapement friction, which invariably tends to retard the short vibrations more than the long. The reverse difficulty is experienced when the vibrations are excessively slow.

If the question should arise why friction retards small vibrations more than large ones, it will find its solution in the fact demonstrated by eminent horologists and mechanicians, that the effects of friction, detrimental to the free motion of a moving body, are inversely proportionate to the squares of the time employed to overcome it.

There is no doubt that the disposition of weight and diameter of a balance has a certain influence on isochronism. The diameter meant here is not the apparent diameter of its extreme circumference, but is determined by the distance of the centre of gyration from the centre of the balance. This centre of gyration corresponds to the centre of gravity of a pendulum, and its position varies with the form of the balance. If, for instance, the cross-bar is very heavy, the centre of gyration is nearer to the centre of the balance than when it is light. In a compensation balance its position would much depend upon the thickness of the rim and the size and weight of the screws. We find that isochronism is differently affected when the relative force of the spring is diminished by increasing the weight, to what it is when this is effected to the same extent by an increase of the diameter. But as it is impossible to know the exact position of the centre of gyration in each balance, and owing to the consequent difficulty of knowing beforehand whether the addition of a screw, for instance, affects the distance of this centre and the weight alike, or one more than the other, any attempt to procure isochronism by this means must remain guesswork more or less.

The resistance of the air has upon a balance a similar effect as upon a pendulum. This is much more apparent in a large and light balance than in a small and heavy one, and it is partially owing to this cause that the replacing of brass screws by others made of gold or platinum the long vibrations generally become slower.

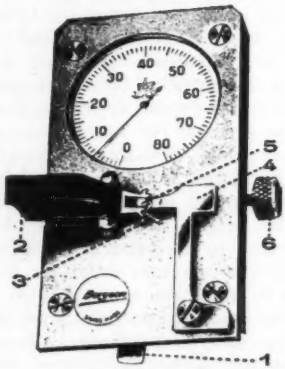
By adding to or diminishing the weight of a balance by means of screws of different shape and using materials of different specific gravity, we can obtain isochronism at a good many rates of going, the degrees of velocity themselves being powerful factors in this respect. The drawing out of screws, for instance, produces an unequal effect at different rates of going. Experiments of this kind can easily be made with any good watch or chronometer.

For the sake of illustration I shall note down the result of an experiment made with a lever watch having a Breguet spring, which was perfectly adjusted at 18,000 vibrations in an hour. I shall call the long vibrations V, and the short ones *v*.

A pair of small screws added.....V — 18
v — 18

BERGEON

Apparatus for Adjusting Escapement Jewel Levers No. 2229



This is a simplified method of adjusting an escapement. With this tool, all that is necessary is to estimate the retouching to be done in hundredths of a millimeter and then simply advance or turn back the escapement jewel lever.

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THE BALANCE SPRING—Continued

Another pair added	V — 1′7″ *v* — 1′5″
Another pair substituted for a pair taken out	V — 1′0″ *v* — 1′0″
Two very small screws taken out, and all the others considerably drawn out	V — 1′16″ *v* — 1′14″

The time of observation was an hour in each case, the watch remaining in the horizontal position. By using screws of different shapes and materials these experiments can be modified indefinitely, sometimes with astonishing results. The inference to be drawn from these results is, that the active elements—*viz.* diameter, weight, velocity, and resistance of the air—are partially opposed to each other, and if they are affected alike, or so that the balance of power between them is not disturbed, isochronism is not altered; if unequally affected, the result is a difference in long and short vibrations one way or the other. By making a great number of experiments with one and the same balance, the isochronal value of each of these elements can be ascertained, but any rule based upon these experiments would only be applicable to this identical balance; other dimensions, even the application of another spring, would necessitate another set of tedious experiments.

These facts will be sufficient to disprove the idea entertained by some watchmakers that a spring adjusted in long and short arcs to a certain balance would retain this quality when attached to another of different dimensions, unless, indeed, it was by the merest chance; and, taking it for granted that isochronal adjustments depend upon the form of the spring, they will go far to explain why these forms differ when balances of different dimensions are used.

But if the elements constituting the momentum cannot with advantage be used to procure isochronism there are certain rules based upon them which determine the diameter and the weight of the balance when in connexion with trains calculated for different numbers of vibrations in a given time in order to procure vibrations of a suitable extent.

(Concluded Next Month)

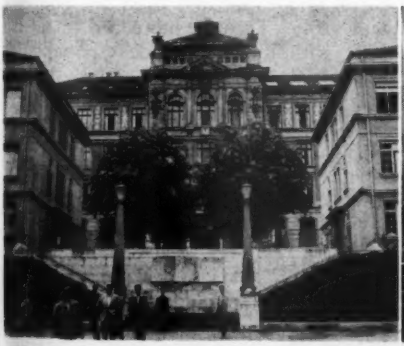
Swiss Watch School Stresses Precision and Craftsmanship

FROM the arched window Max Wyss looked out to the piney slopes of the Jura and to the Suze River plunging through a narrow gorge into the valley. "There you see a fair sampling of our resources," he said. "Some timber, waterpower and lots of beautiful scenery. But that's all. If we had to depend on these, most of us would be starving. Instead, we depend on our skill—and we keep it alive in just such schools as this."

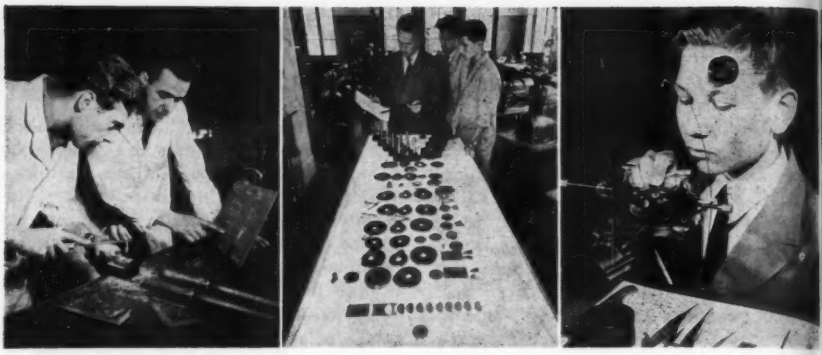
Mr. Wyss is the director of the Horological School of Bienne, in the heart of Switzerland's watchmaking region. Behind the school stands the old town of Bienne, a picturesque jumble of crooked streets and fancifully colored houses dating back to the Middle Ages. Before it lies the new town, a symmetrical pattern of modern buildings, fond of calling itself "the city of the future." Few visitors recognize Bienne as an industrial center, for there are no clanging stockyards or erupting chimneys. Its 101 watchmaking factories, with their carefully tended lawns, can hardly be distinguished from the surrounding apartment houses and schools. Yet they are closely linked with the town's prosperity: nearly ninety per cent of Bienne's 50,000 inhabitants are directly dependent on watchmaking for their livelihood.

"It is no secret that Swiss watchmakers are better paid than any comparable group of workers in Europe," Mr. Wyss told a visitor recently. "One reason is the complexity of the watch itself. Here you have an instrument which must have extreme endurance and at the same time almost infinite precision. A watch runs on only 1/100,000th of a horsepower, yet it must work for years without stopping. One of its parts, the balance wheel, oscillates 18,000 times an hour. In 20 years its rim travels a distance equal to three and a half times around the earth. Some parts are measured to a tolerance of one-thousandth of a millimeter—that's one-twentieth the thickness of a cigarette paper. Some of the screws used in a watch are so minute they look like specks of dust. Thirty thousand of them can be poured into an ordinary thimble. But if you examine one under a microscope you will see that its head and threads are carefully ground and polished."

Another reason for the watchmaker's high pay, Mr. Wyss said, is the length and thoroughness of his training. It takes as long to become a watchmaker as it does to get a university degree. Most workers, including horologists, toolmakers and draftsmen, devote four years to special



(Left) Bienne Technicum houses the horological school in the building at the right. In other buildings are the electrical and mechanical engineering schools. (Right) First-year students at the Bienne school work on the tools they will need during their four or five years of training. Students don smocks and slippers before entering the shop lest dust from street clothes get into watch movements. Smoking, flowers and foods are forbidden in workrooms because odors have harmful effects on fine watch oils.



(Left) First task for the student watchmaker is filing a wooden vise block accurate to one millimeter. Work gradually becomes more precise until the student is working at tolerances of one-thousandth of a millimeter. (Center) The tools needed to make a single watch part are laid out on a table. (Right) Wearing a loupe, the badge of the watchmaker, student Heinz Eggli rolls a pivot.

studies before they are qualified for watchmaking jobs. Technicians, who help put new models into production, study for five or six years. Even the *regleurs,* the men and women who perform the delicate and specialized work of attaching the hairspring to the balance wheel, must spend two years at a horological school.

Before a student is accepted in the Bienne school, he must pass an entrance examination in mathematics, drawing, physics, composition and languages. Then he takes a nerve-wracking psycho-technical test to prove his aptitude for high precision work. To measure his dexterity, for example, he is given a metal plate with pin-point holes, a pair of tweezers, a small screwdriver and a container of screws the size of uncooked grains of rice. While the test is being timed, he must pick up each screw with the tweezers, place it in one of the holes and turn it in. To test his powers of concentration, he is given an instrument with a metal pencil mounted on two arms, each of which is connected with a wheel. The pencil is moved forward by turning one wheel and sideways by turning the other. The problem: to draw a perfect circle by turning both wheels simultaneously.

"By the time the applicant has finished a few more tests like these," Mr. Wyss said, "we know pretty well whether he can learn to do high precision work. We also know a good deal about the state of his nerves."

If the student survives this scrutiny, his work for the next four to six years is clearly laid out. He will take 45 credit hours a week, one-third of them in the classroom and the rest in the workshop. Theoretical studies required of a watchmaker cover a wide range—all branches of mathematics, languages, physics, chemistry, mechanics, law, accounting, mechanical drawing, even astronomy. In the workshop he not only makes an entire watch from mainspring to jeweled lever, but learns to make all the tools he will need for his professional career. To give a more graphic idea of what this means, Mr. Wyss took a single watch part, the barrel bridge, and put it on one end of a long table. Then he proceeded to fill the table with the tools made especially for its manufacture—stamps, cams, gauges, gravers—seventy-five pieces in all.

"These are the tools needed for the factory manufacture of one part, mind you," he said, "and it is by no means the most complicated. The average jeweled-lever watch has more than 150 different parts. Some of the more complex chronographs made by our students have 300. If I were to show you all the tools required for a whole watch, it would take more floor space than we have in the school."

Some students find that getting used to the watchmaking routine is nearly as difficult as the work itself. Talking among the students is discouraged, smoking in the workrooms is strictly forbidden; no

flowers, fruit or food of any kind are allowed inside. When students arrive in the morning they must change their shoes for clean slippers and cover their street clothes with smocks. These rules are not the idle whim of a teacher; they have been laid down by the watchmakers themselves. Talking is frowned on because the moisture of the breath can have a disastrous effect on a watch movement. Smoke and the odors of flowers or food can ruin its fine lubricating oils. And a speck of dust falling into the watch from street clothes can be a lethal as a monkey wrench in a gear box.

In the workshop, the student proceeds gradually from the simple to the complex, sharpening his eye and refining his touch as he goes along. His first job is filing to exact measure the wooden vise block he will use throughout his training. From wood he turns to metal work, laboriously fashioning every tool he will need—punches, rules, calipers and spindles. Once he has a collection of tools at hand, he begins making the watch itself, starting with the relatively simple backplate and proceeding to such delicate work as the pivot of the balance staff.

To an unpracticed eye, a student performing the "pivotage" (polishing the pivot), seems to be working on thin air, for the hair-size pivot turning in the lathe is virtually invisible. After it has been turned, the pivot is rolled with a file-like instrument so fine that it feels smooth to the touch. Small as it is, the pivot must be perfectly formed, with rounded end and sharply defined shoulders, so that when inserted in the watch it turns against the jeweled bearings with an absolute minimum of friction and wear. The nearer perfect the pivots, the longer the life of the watch.

As his schooling progresses, the student is introduced to the fabulous machines that will help him make the watch. These include the electric timing machine, which takes a kind of cardiogram of the watch, recording its beat on a graph to show whether it keeps true time; the electric microscope, which blows up a tiny watch wheel to the size of a locomotive gear, showing each perfectly machined tooth; a weighing scale so fine that it can be thrown off by changes in room temperature; and a jig-boring machine precise enough to split a hair into 50 equal parts.

"With such machines available, you may wonder why we concentrate so heavily on hand work," Mr. Wyss said. "The answer is, first, that the only way a watchmaker can get a feeling for real precision is through constant manual practice. Secondly, no worker can fully understand the operation of a machine unless he can do the same work without it. Finally, some of the most precise work in watchmaking can be done only by hand."

One job for which a machine has never been devised is the delicate finishing of the watch. The mounting of the hairspring on the balance wheel is particularly difficult because the slightest variation in the curve of the spring, its tension or length, will throw the watch off by many minutes a day.

But probably the most difficult of all is the assembling of the vital parts and the *mise en marche,* which is a little like starting the breathing of a new-born baby. The balance wheel, the jeweled lever and the escape wheel must all be synchronized and set in motion so that each acts and reacts exactly as it should with the other, assuring the smooth, faithful running of the watch.

About the time the student is learning this process he may be getting his first job offers. Manufacturers begin sizing up students as much as a year before graduation and frequently the young watchmaker receiving his diploma has half a dozen jobs to choose from. His pay will be very high by European standards and will allow a living standard comparable to that of the American worker.

"In any case," Mr. Wyss said, "wages are only part of the story. The Swiss watchmaker seems to take real pleasure in his job. Partly it is because he realizes its importance—watches literally buy much of the food we have to import. But he also has a genuine pride and interest in workmanship. I know many watchmakers who spend their evenings repairing their neighbors' clocks."

This may well be. Mr. Wyss himself, his students report, spends more time at the workbench and the designing board in his office than he does at his desk.

* * *

New Swiss Watch Calibers

Shown here are the newest watch calibers (movements) to be added to Part One of the Official Catalogue of Swiss Watch Repair Parts. Current owners of the catalogue are advised to clip each box and paste in the blank spaces to be found in the loose-leaf publication. The page number appearing in the upper right hand corner of the box is provided as a guide.

Movements appearing in Part One of the Catalogue are those of the Ebauches factories.

Additional calibers will be illustrated in next month's issue of A. H. & J.

48

10½

70 H 3.80
71 H 3.45

48

10½

89
Moon phases

101

13

92
Recording chronograph, economical

55

11½

204 CLD

54

11¼
11½

1336 AUT. SC
1361

54

11½

1221 CLD SC
Adaptation of AS 1221

55

11½

203 CLD
Moon phases

48

10½

560 SC

54

11½

1256 AUT. SC

41

9¼

1320 AUT. SC
1323 AUT.

41

9¾

1216 AUT. SC

38

8¾

1301 SC
1308 AUT. SC

24

6¾—8

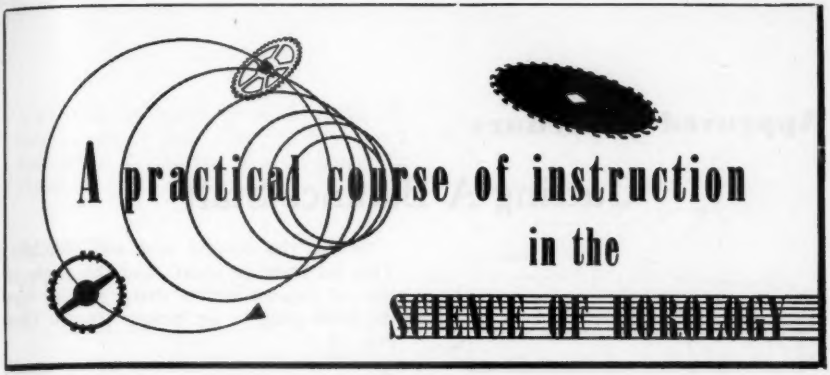
540 SC

Oddities in Time

Newest addition to the time museum at Denver's Clock Manor is this Japanese mystery clock, made by Daitoku Tokei Kogyo Co., Ltd. of Tokyo, and presented as a gift to Orville R. Hagans, owner and operator of Clock Manor who has been figuring in an international exchange of horological knowledge with Japanese craftsmen and historians. The clock is a combination fish bowl and planter, and one side of the glass case carries the hands and dial. There is no apparent motive force for the hands, despite a tongue-in-cheek theory that the energy is furnished by the waggling of the goldfishes' tails. Oddly enough, the clock is not waterproof.

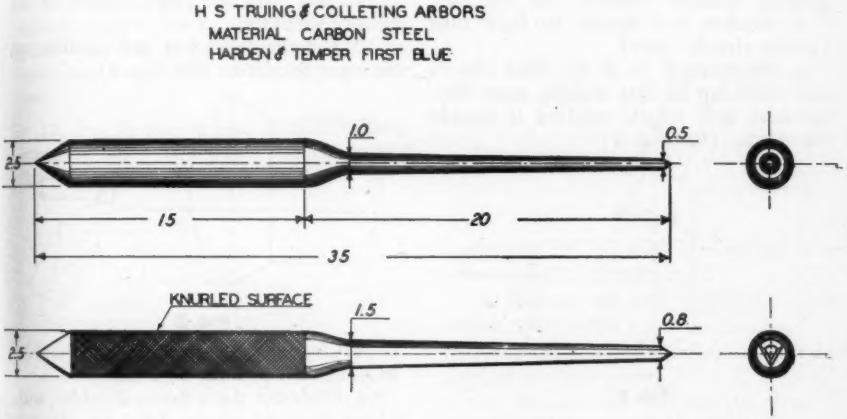
Forerunner of the modern electronic watch is this converted pocket watch featuring a coil and synchronous motor, constructed by an unidentified horological engineer over 25 years ago. Power is supplied by a battery encased in the cartridge at top left in photo, to be carried in the wearer's pocket. This watch and the tiny clock in picture at left are from the collection of Mr. Barny of New York City.

Watchmakers necessarily develop a perspective in miniature from working with tiny timekeeping mechanisms all day long. Fittingly, two horologists from Clock Manor carry their vocational perspective into their recreation and are shown here playing chess with eye loupes and tweezers. The board and chessmen were all turned out with watchmaker's tools by Henry B. Fried of New York. Timing the event is the world's smallest clock (perched atop the bench block in center background).



By Orville R. Hagans and D. L. Thompson

WATCH REPAIRING—LESSON 26



(Continued Next Month)

Approved Procedure . . .

Cutting A Balance Staff

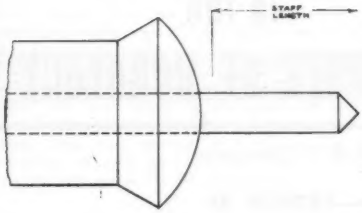


FIG. 1

1. Select stock slightly larger than the greatest diameter required for the hub.
2. Harden and temper to light blue (unless already done).
3. Select chuck to fit the stock *exactly* and chuck up so that slightly more than the total staff length required is outside the chuck. (See Fig. 1)

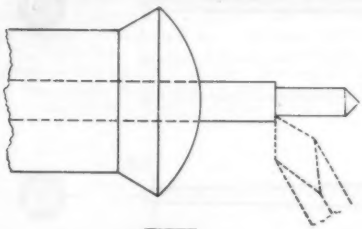


FIG. 2

4. Check the sharpness of the diamond graver. Sharpen if necessary.
5. Cut a 45-degree point on one end of the stock.
6. Make a brass plug of a thickness equal to the height between the balance seat and the top of the upper pivot, with a hole large enough to fit over diameter of the balance shoulder.
7. Adjust the T-rest close to the stock and parallel with it.
8. Cut the balance seat and shoulder. This cut must be square and the angle of the cut cleaned with a sharp graver. Use the brass plug to get proper length. (See Fig. 2)
9. Clean the surfaces just cut by means of fine oilstone powder and a slip.
10. Make a brass plug of the thickness of the balance arm plus .05 mm., and with a hole to fit the balance shoulder or somewhat greater.
11. Insert this plug on the cut already made, and mark the proper height of the balance shoulder.
12. Cut the collet seat and shoulder on the taper required. (See Fig. 3)

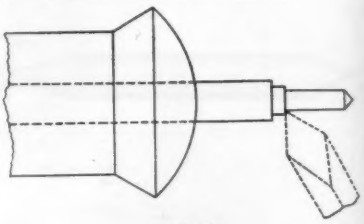


FIG. 3

13. Clean off the tapered collet shoulder with oilstone powder on a slip.
14. Undercut the balance shoulder with a long diamond graver. (See Fig. 4)

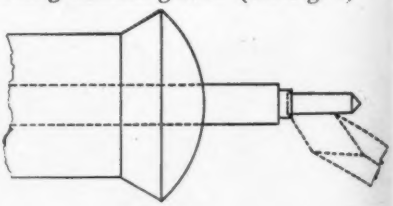


FIG. 4

15. Cut the upper pivot to within .02 mm. of size or less. (See Fig. 5.) Use a hole jewel of proper size to gauge the diameter.

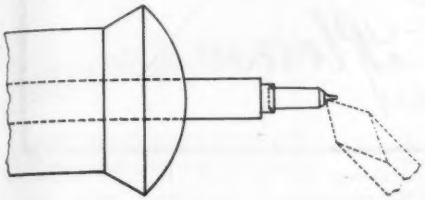


FIG. 5

16. Polish the upper pivot, preferably with a burnisher.

17. Obtain a piece of brass whose thickness is equal to the height required for the hub. Use this to measure and mark the stock for the bottom of the hub or roller seat.

18. Cut the hub to final diameters on the required taper to a point slightly beyond the mark just made. (See Fig. 6)

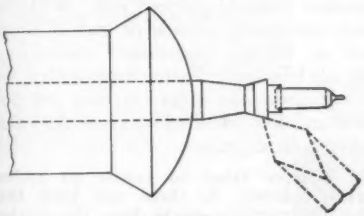


FIG. 6

19. Clean off the hub surface with oilstone powder on a slip.

20. Cut the roller shoulder on the required taper to final diameters, using the comparison method for measuring with a piece of brass whose thickness is equal to the larger of the two diameters. (See Fig. 7)

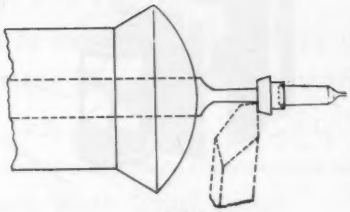


FIG. 7

21. Clean off the roller shoulder with oilstone powder on a slip.

22. Cut the lower pivot to within .02 mm., of the final diameter or less, or as close as simple comparison with the other pivot will permit. (See Fig. 8)

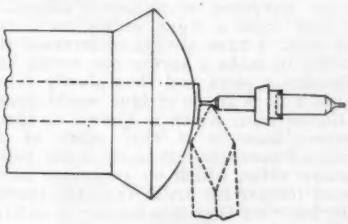


FIG. 8

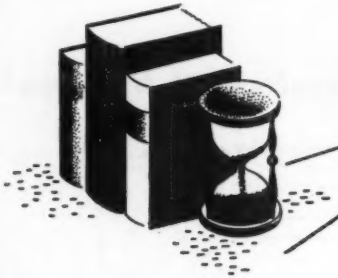
23. Cut off the staff, leaving the lower pivot slightly too long.

24. Measure the total length of the staff with a micrometer.

25. Chuck up on the collet shoulder and polish the lower pivot.

26. Burnish the end of the pivot to length. (If the pivot needs more than just the polish to bring it up to size, the staff must be trued in the chuck, using pegwood and rotating slowly.)

Note: The stock must not be removed from the chuck at any time until all operations up to and including cutting the staff from the stock are completed. Doing so is sure to result in an untrue staff, with consequent bad results in the watch.



INFORMATION *Please*

FF: I recently fell heir to some old tools and a lot of mainsprings that belonged to an old watchmaker who passed away. These mainsprings are mainly for 18S and 16S watches, such as Rockford, Aurora, Trenton, Illinois, Elgin, Waltham and several others. I notice that the mainsprings are all tempered to different colors, all the way from a light yellow to a rich, dark blue. I have always understood that in order to make a spring one would have to harden a piece and then slowly reheat it until a dark shade of blue would appear on the surface, which is known as spring temper. How is it that some of the springs I have are left in the light yellow or straw color, which we recognize as the correct temper for drills, taps and turning tools, knowing that this temper is entirely too hard for mainsprings? Was special steel used in the early days for making mainsprings, and would hardening the steel and reheating to a yellow color produce a spring temper?

Answer: In the early days when mainsprings came into use, even as far back as 1550, when Peter Henlein built the first timepieces, he used an iron band. From that early beginning there has been a continual competition among mainspring manufacturers to produce a mainspring that will not set or break. The early mainsprings were hammered out to ribbon form, rolled up, hardened and tempered to spring color, which served very well for clocks. But as time went on, the art of rolling steel between two steel rollers, bringing the surfaces down smooth, and a spring of equal thickness throughout its length was the next big improvement. However, they still hardened and tempered the springs by hand, as no instruments were available at that time to test the hardness of the steel. In making mainsprings at that time, the treatment of the steel was kept a secret. In order to keep the treatment of the steel a secret, they would harden a spring and draw the temper to a certain color which proved the best and most serviceable for mainsprings, and in order to keep this a secret, they would remove the surface color and reheat the spring to some false color. So the mainsprings you possess were probably drawn down to keep the true spring temper of the mainspring a secret. They have found that rather than taking the true color off entirely, leaving the surface of the spring white by reheating it to some lighter color, is merely causing an oxidation that helps to prevent rust. With our latest mainsprings, made of special alloys, such as Elgin's Durapower mainspring, they are heat-treated after being rolled, but do not show any color, as they are polished and left polished so as to yield easy and smooth slippage.

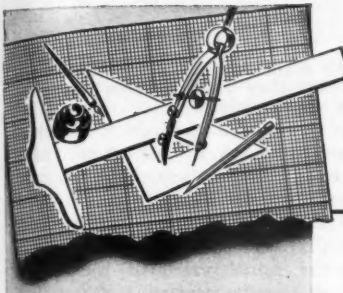
OL: I have tried to repair or re-line cuckoo bellows. Is there any book that gives instructions as to how the leather is folded, or can you send a pattern with instructions showing what material to use and how to fold. I have tried to do the job several times, but end up in failure.

Answer: Your writer is not aware of any

INFORMATION PLEASE

Directed by
W. H. SAMELIUS

Chairman, Science of Horology and Technical Advisory Board



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book giving or showing the procedure for folding leather for cuckoo bellows. It may be that some of the advertisers in the *American Horologist and Jeweler* can or will send you a pattern showing how the creases are made for the bellows. I might suggest that you correspond with Mr. J. E. Coleman, our Clock editor, who may be in a position to furnish you with the desired information.

MTR: At one of our guild meetings, the questions of barrels and mainsprings was the topic. Is there any fixed ratio of teeth in the barrel and leaves in the center pinion?

Answer: In our modern watches, we find that the ratio between the barrel and center pinion is from 6-to-1 to 7-to-1, and with our modern mainspring, we get anywhere from six to seven turns of mainspring power from the barrel, so if we have a barrel of 72 teeth and a center pinion of 12 leaves, the ratio would be six turns of the center pinion to one turn of the barrel. If the barrel and mainspring make 6½ turns, the watch would run 6½x6, or 39 hours. This was the watch as we had it a few years ago, but with the improved mainspring that can be made considerably thinner, we get more mainspring turns, up as high as seven, and the gear ratio between the barrel and center pinion has also been increased so that we may find in some of our late watches, a barrel having 63 teeth and a center pinion of nine leaves, which would be a 7-to-1 ratio, and then if the mainspring delivers seven turns of power, the watch would run 7x7, or 49 hours. It is not unusual to find a watch nowadays that will run anywhere from 40 to 50 hours on one winding.

LFP: I have a slide rest that is calibrated to read in 1/100 mm. What can I do to convert it over to read in thousands of an inch?

Answer: If you want the readings to show inches, you would have to have a new lead screw of 40 threads per inch; then the collar will be calibrated into 25 divisions, each division representing 1/1000th of an inch. You could also use the slide rest as it is by transposing millimeters to inches by multiplying your metric dimensions by the constant .03937. You will then have dimensions in inches. Thus, transposing 2.3 mm. to inches: 2.3x.03937 equals .090551 inches.

FTY: So many jewelry stores frown on clock work—they claim it does not pay. What is your opinion?

Answer: It is true that many jewelers frown on clock work, or will not even take one in for repairs, as they claim the time used for repairing a clock can be used more profitably in repairing watches, and the cost of repairing a clock many times exceeds the actual value of the clock. Clock work can be profitable if handled the same as watch work.

Give an estimate for the work required or time required and inform your customer. Let the customer decide whether he wishes to spend that amount of money on the old clock, or if he prefers to purchase a new one. More often than not, these old clocks that are brought into the store are keepsakes and have sentimental value, and the customer is quite willing to pay for the repairs. But it seems that many stores will take the clock as an accommodation and repair it at a low figure, knowing all the time they are losing money on the job, but living in hope that the customer who owns the clock will return some day to purchase some piece of merchandise. In that way, the jeweler will be compensated for the loss of time in repairing the clock, or he may be in hopes that repairing the clock at, we might say, a loss, will be the means of bringing in some of the family's watch work. He is using his clock work as an advertising means, and the loss of the clock work should then be charged to advertising. However, it would be better to treat the clock's coming in the same as you would a watch, making a profitable estimate on it, staying out of the red and still having a satisfied customer who will continue to bring you his work.

VG: How can I determine the proper sized drill for drilling a hole for threading?

Answer: Deduct the distance of two threads from the full diameter of the tap you are to use, and then you will have a suitable drill that will give you a full thread.

OD: Can you tell what distance or space between regulator pins is allowed in a railroad grade watch?

Answer: The normal position of the regulator pins is to have them as close to the hairspring as possible without actually impinging the spring. If this condition is correct, you may test by moving the regulator, and if the pins are too close, the spring will not slip between the pins freely. But if the pins are too close and grasp the spring, the reg sweep and hairspring proper may become buckled, then regulation for slow and the hairspring sweep may be straightened when regulating fast; the hairspring will be pulled to one side, making the spacings between the coils uneven, throwing the hairspring off center and we may say, out of poise.

ML: Some time ago a salesman stopped in, showing some clocks and desk clocks with alarm attachment having a tandem drive. The information he gave was probably a selling feature, and it has bothered me. What did he mean by a tandem drive?

Answer: A tandem drive clock is nothing new. However, some of our manufacturers of late have introduced the tandem drive, which means they are using one mainspring to drive the time train as well as the alarm train. The advantage to the manufacturer is that it takes less parts and only one mainspring. But the question is that the mainspring is usually quite strong and will create considerably more wear throughout the train from the pivots, and time will tell how practical this tandem-drive clock or watch will prove to be.

DA: I recently took in a cylinder watch for cleaning and repairing, and after assembling it, I find the escapement is too shallow—by this I mean the tip of the escape tooth does not drop-lock on the cylinder, but the impulse face of the tooth drops on the lip of the cylinder. I have had very little experience with cylinder watches. What can I do to overcome the trouble?

Answer: You will find that on all the better-grade cylinder watches, the balance bridge is attached to a lower bridge or chariot. This chariot is attached to the underside of the lower plate. By loosening the chariot, it can be moved forward towards the escape wheel, and when the upper balance wheel is attached, you will find the escapement deeper. Having two bridges allows you to move the cylinder forward or backward, or in other words, in and out of the escape wheel, retaining

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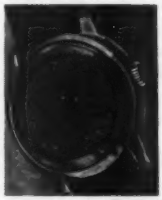

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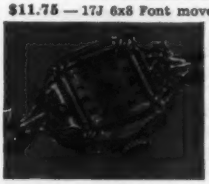

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the cylinder and balance upright. If you are working on a cheaper-grade watch where there is no means to adjust the escapement, there is not much you can do about it without entailing considerable work. In that case, your best move to make is to move the escape wheel forward by plugging the pivot holes and establishing new centers to the required amount so the escape wheel will have drop-lock. The arc of the balance is not like that of the lever watch. In the cylinder watch, a balance will not take more than one-half turn, as the balance is not free to swing after the impulse is given. The tooth of the escape wheel is either resting inside or outside the cylinder, creating a friction that retards the free swing of the balance. The cylinder and duplex escapement are both known as "frictional" escapements.

GTO: The automatic watch as we have it today seems to be practical and coming more into use every year, but I am curious to learn when the idea of automatic watches came about.

Answer: Automatic-wound watches are nothing new; it is only that our modern watches have been improved and modified and are practical. From history, we find that Napoleon carried a self-winding watch that was wound by the motion of the body while walking. This watch was made to order by Breguet, the famous watchmaker. Breguet was born in Neuchatel, Switzerland, in 1747, and is credited with the discovery and invention of the overcoil hairspring. He is also credited with the introduction of draw on the pallet stones.

CWD: One of my customers is interested in the age of his key-wind watch which he recently brought in for repair. It has an 18S movement and the number is 127084. It was manufactured by the United States Watch Company, and bears the inscription, "G. A. Read, Marion, N. J."

Answer: The United States Watch Company was among one of our early watch manufacturers and was organized in 1864 at Marion, New Jersey. When G. A. Read was an officer of the company he was honored by the naming of that particular movement, "G. A. Read." The company failed in 1872, and was reorganized as

the Marion Watch Company, but it failed again shortly afterward. From the serial number of the movement, your writer would judge this to be among the last movements to be made before their failure. There are no records available showing the dates when the serial numbers left the factory.

EI: What do these material dealers mean when they claim their material is all by standard system?

Answer: From the Watchmakers of Switzerland's "How to Get More Out of Your Catalogue," we find the following definition: "After years of testing and research, the Watchmakers of Switzerland, in cooperation with the American watchmaking trade, have developed a standard system for identifying the movements and ordering parts. This standard system is intended to replace all systems which American watchmakers now use for ordering Swiss watch repair parts. Basically, the system enables the watchmaker to identify each movement by its factory mark and model number. Every part, including screws for this movement, now has its own number group. Both the watchmaker and his regular supplier will be using this standardized system in ordering parts from the official catalogue."

TA: I have a Swiss watch which is very fine and which my customer values highly for sentimental reasons. The watch has been in several shops, and the last workman opened the holes in the barrel and cover so that they are too large, allowing the barrel to tilt and rub on the lower plate, thus creating poor depthing and cause of stoppage. I have tried to procure a new barrel without success and I am anxious to repair the watch. Can you offer some suggestions as to how I can repair the barrel?

Answer: The barrel you have undoubtedly can be repaired, providing the teeth have not been damaged. First, enlarge the holes, possibly 25 per cent, and then insert solid bushings. Then place the cover on the barrel in its proper position, or mark locating points on the cover and on the wall of the barrel. Cement the barrel to a flat cement chuck, truing the barrel in the round by the teeth. Take extra precaution that the teeth are running perfectly round. Spot a center in the barrel cover and drill a hole to the size of the arbor. Remove the cover and repeat the opera-

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tion on the barrel. This will insure that the barrel will run true in the flat when the arbor is in place. If you have a slide rest, these holes may be bored, which would make a more accurate job.

MTW: I have found in some of our cheap watches that the setting lever is soft and badly worn. To refinish the worn corners is of little avail, as the watch is returned in a few months with the same complaint and by that time, the lever is beyond repair. What can I do to avoid the trouble?

Answer: When you find a soft lever such as you describe, it probably left the factory in that manner, not purposely, but by mistake, as all watch materials made of steel are hardened and tempered. When you find a similar case that shows wear, dress up the corners and edges, then heat the lever to a cherry red and quench in water. This will leave the lever glass-hard; then brighten one surface, laying the lever on a piece of thin brass and holding it over the alcohol lamp, allowing the heat to penetrate the brass plate and the steel lever. When the bright surface of the lever turns a purple or rich blue, it will then be strong enough and have wearing qualities, and give no further trouble.

FNM: I have been told that during World War II alarm clocks were made of compressed paper. Is this so?

Answer: It is true that during World War II there was a scarcity of essential metals, such as brass and steel, so the clock companies were at a disadvantage or unable to produce the regular alarm clock. They substituted thin iron plates and thin iron wheels in cases where the plates, wheels and case were made of brass. In that way, they managed to make an alarm clock, saving brass. The case was made from compressed paper and perhaps that is why you heard that alarm clocks were made from paper. The Westclox Company made these clocks, having a fixed retail price of $1.65, and were called "Waralarm."

BDL: I have been told that one can put a watch out of beat by bending the regulator pins. Is this true?

Answer: It is true that a balance may be put out of beat when opening the regulator pins. If the watch has been put in beat with the regulator pins parallel and upright, and the hairspring playing with equal tension between the pins, it is an easy matter to disrupt the beat. For instance, if your watch is showing a nice straight clean line on the timing machine and you bend one pin away from the hairspring, allowing the hairspring more freedom on one side than on the other, the balance will in turn take a longer arc in one direction than the other. This shows that the balance is out of beat, and is easily proven on the timing machine. If the watch is in beat to start with and you find it necessary to either close or open the pin, always make certain that the spring lies free between the pins when the balance is at rest.

GAE: Some of our shop men got into an argument about pivots. Some claim that a pivot polished by means of an iron slip and diamontine are superior to the burnished pivot. Will you pass on this and give your opinion?

Answer: Theoretically, a pivot that is ground and polished by means of an iron slip or bell metal, using diamontine or croecus for the glossing, will give very satisfactory results. However, if the pivot is soft, it will not have lasting wearing qualities, but if the same pivot were burnished it would have a hardened surface which naturally would have better wearing qualities. Many watchmakers attempt to burnish the pivot, but burnishing a pivot in a lathe is not very successful, as enough pressure cannot be applied to accomplish a good job. There is on the market a lathe made specially for burnishing pivots, known as the Jacot lathe. When using this lathe, the pivot is supported in a V-groove, and then the burnisher can be applied with sufficient pressure to yield a smooth and hardened finish. Our factories today burnish all their pivots.

DOC: We often see and hear about soap that is 99-44/100% pure. How close to time must a watch run to show 99-44/100 perfect time?

Answer: While 99-44/100% sounds or looks close to perfection, a watch running at that rate would show an error of 8 minutes and a fraction during a 24-hour run, which would not be acceptable, generally speaking, as a timepiece. A railroad watch showing a 5-second error in 24 hours would be 99.9942% perfect.

WFI: I have seen a watch which the owner states is a left-handed watch. That is,

the hands travel backwards and the dial is printed in reverse. It is a 16S watch, made by one of the guild members. I was fascinated with the watch and would like to make one like it. Can you give me some information as to what has to be done?

Answer: To make a watch over as you describe entails quite a little work. First, you will have to make a clutch and pinion that winds to the left. You will then have to reverse the click and click spring. Following this job, change the hook in the barrel hub to wind in reverse. You would also have to change the hook in the barrel. That would complete the work as far as making the train run backwards. You would then have to reverse the escapement by turning the escape wheel over and also turning the pallet and lever over. If it is for a double roller balance, in some cases, you might turn the roller table over. If it should be for a single roller watch, you would merely have to insert a new guard pin to reach the roller table. These are suggestions that may have to be modified, depending on the model of the watch.

Pepper was so highly regarded during the Middle Ages that kings exchanged small quantities as appropriate gifts. Because of the high regard for it, pepper was always kept in boxes of gold, heavily bejeweled. In modern terms some of these boxes would be worth several thousands of dollars each. One such box, owned by King Albert I of Austria, 1298-1308, was three inches long, two inches across and two-and-a-half inches tall. Its lid contained 34 diamonds and other precious stones and another 102 stones ornamented its sides. A prized possession of the Vienna Museum, the box disappeared shortly after the "anschluss."

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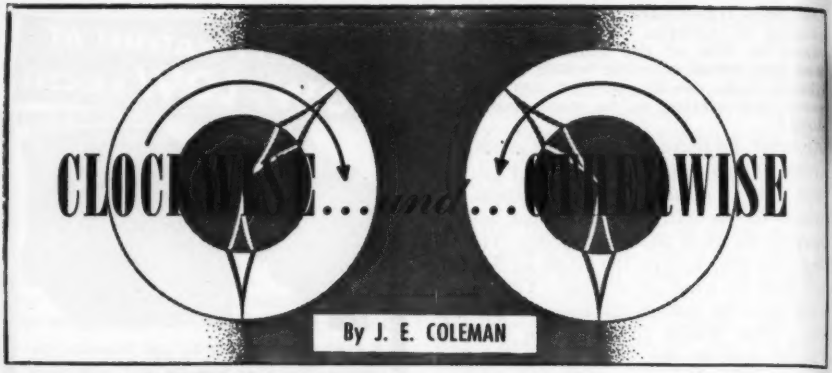

OTHERWISE

The past month has been a bit quiet in so far as reporting may be concerned; several visitors and good letters—however, a majority of the items seem to fall into the "hold" file.

One of the really big events at "our house" this month was when our "secretary" celebrated her first birthday (September 30). We'd planned to stand her alongside our stack of *American Horologist & Jewelers,* some 200 from January, 1936, through this month, but the young lady didn't fall in with that plan too well. First, we discovered that the magazines were some five or six inches the taller, and when stacked, weren't very steady. Second, at that moment she was imbued with so much vim, vigor and vitality that we could not keep her still long enough to catch a sharp focus on the groundglass and at the same time prevent her from toppling the stack of magazines. All in all, the only out seemed to be a seated pose with some "play-like" reading.

C & O Secretary

* * *

Some time back we had query from Mr. Robert Allen, Mexico City, regarding a "John Cross" watch, Charterhouse Square, London. Baillie's list gives John Cross as being active from 1802 to 1840, but no address. Mr. C. S. Ilbert, 10 Milner Street, Calogan Square, London, has two pieces by Cross in his famous collection, and cooperates by writing: "Movement No. 32,460 has John Cross, Charterhouse Square, London, on both the cap and back plate. It has a white dial, gold hour and minute hand with steel subsidiary dial, seconds hand, lever escapement, auxiliary temperature compensation. Movement No. 36,704 is exactly same except slightly smaller." Mr. Ilbert points out that Britten gives John Benyhill Cross, Jeuin Street & Charterhouse Square, 1822 to 1845, 23 Moongate Street, 1850 to 1852. Livery C C, 1834.

* * *

A good letter from Mr. J. M. Finigan, of the United States Time Corporation regarding the Waterbury, eight-day, Karrusel clock we ran in Otherwise for August:

"During the past three months we have on several occasions looked through groups

---

Mr. Coleman invites your questions. If your question requires a direct answer, please enclose a self-addressed, stamped envelope. It is impossible through correspondence to give valuations of antique timepieces, questions of this nature cannot be answered.

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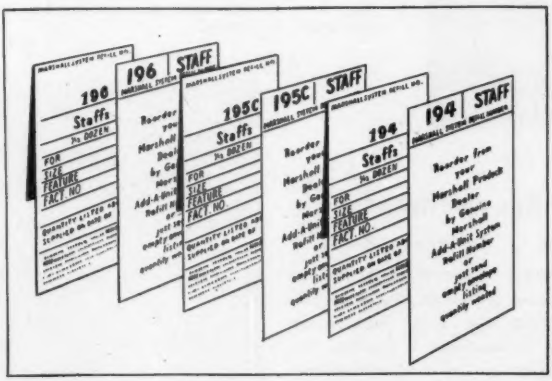

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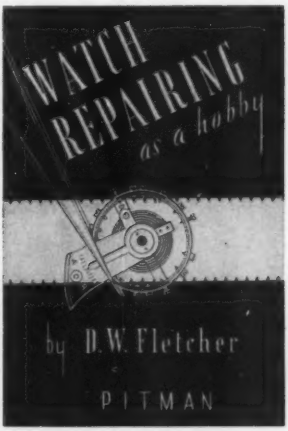

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Watch repairing, besides being extremely useful, is also a very fascinating pastime. This book explains the easy adaptation of simple skills to a fascinating hobby for fun or for profit. The experience obtained through the use of this text and through practice will be found invaluable not only in the field of horology, but in many other pursuits mechanical. Illustrated. 62 pages.

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Watch Escapements

by Dr. James C. Pellaton B-207

The author was formerly director of the school of Horology, Le Locle technicum Neuchatelois. The book is used in the Swiss horological schools in a course of horology. It explains the escapement, its functions in distribution and control of power. It gives a complete detailed description of all types of escapements. Illustrated. 125 pages.

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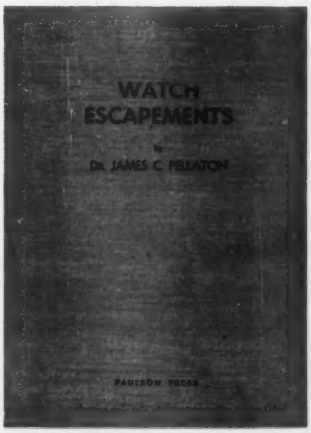

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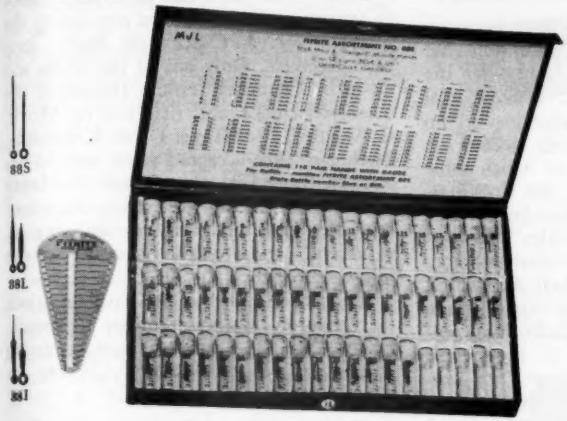

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of our old catalogues trying to identify the clock to which you refer, without any success. We find many illustrations and descriptions of clocks of the general type described by you, but each is, in some particular, different from your description. For example, we have not been able to find clocks of this type only 4¾ inches high—most of them are taller. Furthermore, most descriptions show that these clocks were eight-day movements with jewels, and that only the one-day movements were non-jeweled. We regret we are unable to be of any assistance in this matter, even after taking this length of time to reply to your inquiry. If we should happen to locate in the future any reference to this particular clock, you may be sure we will take the matter up with you again."

Thanks, Mr. Finigan, for your fine co-operation.

* * *

This writer, as well as every other bench man with some years of experience, finds that it is not very unusual for some customer to phone or come into the shop and ask about a repair job of some ten or twelve years back. There is a current expression: "Water over the dam"—well, to the busy repairman, if there was ever water over the dam, it's a twelve-year-old repair job, and I often wonder whether or not these factory people like Mr. Finigan, don't have pretty much that same feeling when we pop in a query about an old clock.

On the other hand, isn't there some part, at least, of an obligation on the part of both the repairman and the manufacturer, to hand out some bit of information about their product? Aren't we, as repairmen, and the factories too, overlooking a good bet in the public relations department if we ignore such requests? As was stressed at the Denver convention, Public Relations is fast becoming, if not already, the key to success of any business today, be it repairing or manufacturing.

* * *

A few years back we had occasion to correspond with Cities Service Company relative to a fine watch oil they had produced. Mr. Merle Thorpe, editor of "Serv-

ice," their house organ, put the column on their mailing list and we've enjoyed that publication monthly ever since. In the October issue is described a wonderful photo library which they maintain—set up just three years ago, it already has on file better than 18,500 photos, of which some 4,500 are in color. These, plus drawings, paintings, sketches and simplified charts, are all cross-indexed and Cities Service—credit lines—have already totalled more than sixty million by national magazines, newspapers, industrial house organs, trade publications, educational institutions, encyclopedias, and even the U. S. government. Mr. John J. Reidy, *New York Sunday Mirror,* said: "This is the type of public relations where time, money and imagination are put to good use.'

This must have been a very expensive operation, and goes to indicate what modern business thinks of public relations. It has almost become axiomatic with magazines and newspapers to say, "Want an oil picture? See Cities Service." Suppose they were to want a clock or watch picture. Where would they get it?

* * *

Several offers of a one-day, weight clock to replace that one bombed out during the war for Mr. J. Cauchi, on Malta, have been received. Only one of the clocks was made by Chauncey Jerome (maker of the destroyed clock) and that was by Mr. C. G. Walters, 1241 Texel Drive, Kalamazoo, Michigan. We accepted same, and he has already shipped it down. While it is being cleaned and put in order, letters have been sent Mr. Cauchi, asking for shipping instructions, and to the customs service relative to such a shipment.

It is hoped that we can have this clock delivered on Malta on or by Christmas. I know that I speak for our host of readers when I say to Mr. Walters, "Thanks for your cooperation."

Nice letter from Mr. R. Lassauge, Lizy-sur-Orcq, France. We were privileged to send him some books and catalogs when his mother visited the U. S. this summer. On the whole, watch and clock repairing must be just about the same in every part of the globe, for he says their official national horology program is to include a "professional aptitude certificate" and he hopes that "it will make our craft clean of all quacks."

Don't Turn Down Those Old Jobs

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Clock Manor

1901 E. Colfax **Denver 6, Colorado**

At the bottom of page 32, October issue of A. H. & J., Mr. Samelius, in replying to a rather unusual bit of comment from a fellow who recommends tencent-store oil and not disassembling timepieces for cleaning, says: ". . . but would like to have comments from our readers." I'd bet him odds that if this fellow actually believes and practices what he wrote that he does not even remove his own shoes and sox to wash his feet—the same line of reasoning and makes just as much sense.

One finds it very difficult to believe that men who call themselves mechanics can actually become sold on such "tripe," and would rather feel that they may be doing a bit of "botch-baiting" when they set such unreasonable and foolish practices to paper. It is difficult to be sure—not very long ago we had quite a "set-to" with a fellow workman for using a sort of "short cut" and telling his customers that he was bushing their worn bearings. Believe it or not, this man actually felt that he was doing the job correctly because, as he repeatedly pointed out, he *bought* the material.

This "bought material" simply consisted of a little "gizmo" of brass, thin at that, in which had been punched a slot, and in the end, a small hole. The mechanic is supposed to drill and tap the plate of the clock somewhere near the worn bearing and place the screw through the slot after the small hole in the end has been broached to fit the portion of the arbor pivot extending through the plate. By means of the slot, this "gizmo" is pulled back (adjusted) to a position that will hold the arbor pivot to its original position; then the screw is tightened.

We've encountered this type of botchery several times; in the first place, the average clock has a tremendous amount of end shake in its train pivots. After a short run, a pivot seems to work through a bit more than the original worn groove, and there you have it. Once this irregular groove begins to work in the new applied brass, it not only begins to cut but pulls the arbor forward, creating considerable friction at the shoulder, possibly as much or more friction than occasioned by the original worn bearing. Another bad feature: the tiny crack between the applied piece

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and the clock's plate siphons all the oil (even the 5-and-10) variety) from the pivot by capillary action.

A few years back, some advertising agency created for one of the major paint manufacturers, a slogan: "You can't paint a house with apple sauce." This type of work reminds us of that—just that. I'd as soon try to repair a clock with apple sauce—and honestly believe the job would be about as good. Thus, Mr. Samelius, our comments are, "Apple sauce!"

* * *

Many issues back, we dealt with the repairing of the Sessions electric clock motor and suggested a wooden block for use as an anvil. Comes the last issue of the Black Shield Watchman, cataloging such an anvil or bench block, of metal; recessed to accommodate both the front and back side of the Sessions motor, also Westclox "m4e" and "m4f" and the United motor. We've written Mr. James H. Swartchild (29 East Madison, Chicago 2, Ill.), about it. At press time, sample has not been received. Priced at $1.50, a special Sessions rotor remover and replacer punch for 40 cents may be had with it.

* * *

Mr. Reuben Kuempel, 3611 South Brunswich Avenue, Minneapolis, Minnesota, sends the column some sample blueprints—actual size—and instructions for a kit which he is marketing, $2.95 postage prepaid. In short, it is practically a full-size pattern for building the Terry, one-day, long-pendulum, wood movement.

* * *

A couple of inquiries have come in about the cannon pinion anvil illustrated on page 23 of Mr. deCarle's new book, "Practical Clock Repairing." We saw from the cut that it is a Bergeon production, and immediately wrote Mr. Milton Berman of B. Jadow Company, 860 Broadway, New York 3, New York. He replies that it is Bergeon tool No. 30,600 for de-mounting and re-mounting cannon pinions of alarm clocks—price, $5.25, and available through all regular wholesale material houses. Chances are, your material house does not stock this anvil, but they can obtain it direct from Jadow for you. Sample has not reached the column as yet—will have a further report later.

* * *

If you were called upon to convert a common eight-day mantel striking clock to a Ship's Bell striker, what would your reply be? Or if you just happened to want to make one of these old clocks strike Ship's Bell time, how would you go about it?

Mr. C. L. Ham, clockmaker of 5133 North Concord Street, Portland, Oregon, has solved the problem rather neatly, and in the true cooperative spirit, wishing to share it with fellow clockmakers, sent along sketches and the movement. His letter did not state whether he did it for a customer or just for "the heck of it"—he does point out that before starting the problem he imposed two restrictions upon the solution: (1) no special material, (2) no special tools—just what may conveniently be had in any clock repair shop.

You will immediately recognize from the photo (See page 52) that he chose an eightday Ingraham, hour and half-hour strike—a cabinet clock quite popular 12 to 20 years ago; however, his method can be easily adapted to almost every American eight-day movement with a few slight variations.

Starting with a 16-leaf pinion, 7/16-inch diameter from a manual-wind Westinghouse electric range clock, and a 12-leaf pinion 3/8 inches in diameter from a $1.65 Westclox, he built a plain frame structure of strip brass, two upright members being spaced 5/8 inches apart by pillar post from an old clock movement, said posts being riveted through the cross piece (see sketch) to the back strip. The front strip is held in place by original nuts.

In the center of this framework he drills a bearing hole for its one and only moving arbor; upon that arbor is mounted a brass disc over-all 2 1/8 inches in diameter, cut from 1/16-inch brass plate stock. (See Fig. 3, of sketch.) Pivot upon the back side of the arbor extends through the back strip the right distance to take the 16-leaf pinion.

The 12-leaf pinion is staked friction tight upon the second arbor of the strike train, 1/32-inch below the shoulder to give ample clearance above the back clock plate. The frame assembly is riveted to the back plate, upon the outside (back

side) as indicated in Fig. 1, in position to make the 16-leaf pinion properly mesh with the 12-leaf pinion staked on the second strike train arbor.

Now, the Ingraham count wheel is actuated forward by two pins extending out of the third strike train arbor pinion, thus you will see that a 60-tooth count wheel being driven forward two teeth per revolution of the third arbor pinion will be advanced 20 teeth per one complete revolution of the hammer lift-pin disc you have just attached (60 teeth in second strike wheel driving 8-leaf third arbor pinion).

The hammer lift-pin disc is inscribed with a circle 2 inches in diameter; this circle is divided and drilled to take 20 pins (steel) as shown in the outside view in Fig. 3; pins are ground or cut to 7/32-inch long both above and below (inside and outside) cut or ground off flush with the brass disc pins as indicated on the inside sketch at 1-bell, 3-bells, 5-bells, and 7-bells.

Secure a 60-tooth wheel of proper diameter to work as the count wheel and cut as indicated in Fig. 4. Since 20 teeth of this count wheel are actuated forward by one revolution of the hammer lift-pin disc, and this disc is already constructed to give the correct ship's bells from one through eight, we shall get three eight-bell watches (20 into 60 equals 3) per revolution of the count wheel.

Two hammers are constructed and fitted to brass collars that work over the frame pillar post. If, as in Mr. Ham's case, it is desired to mount the bell above the case, these hammers work upon the top pillar, and each has a small coiled spring to make it strike the bell from inside. Should it be desirable to mount the bell or gong within the case, the hammers may go upon the bottom pillar-post and fall by gravity. The hammer-tail pieces are made with 1/16-inch difference in length to make the hammers strike "true pairs."

We've condensed Mr. Ham's sketches slightly, and made this suggestion (which he has approved): "Upon other movements—i. e., different strike train ratios—it would be quite practical to enlarge the hammer liftpin disc by approximately an eighth of an inch (2 2/8-inch diameter), still retain the pin circle at two inches,

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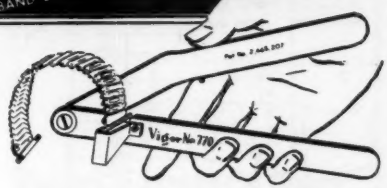

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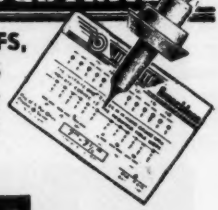

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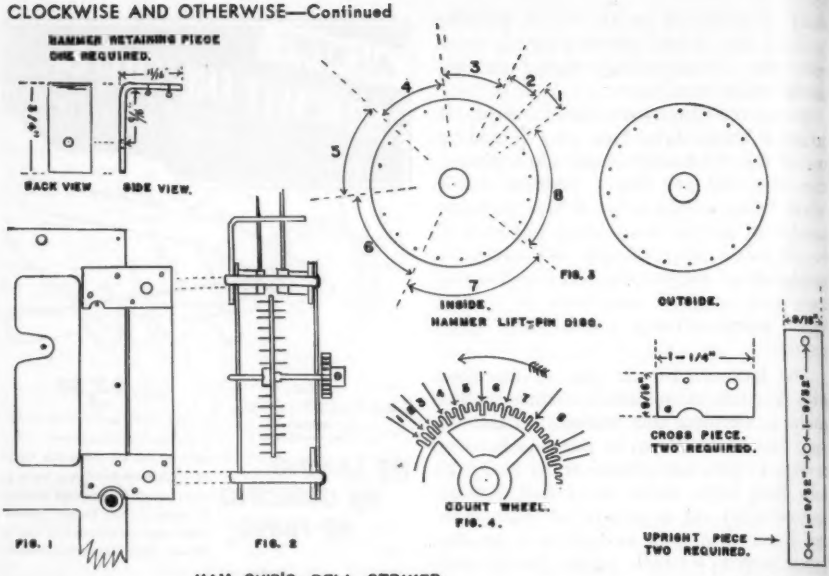
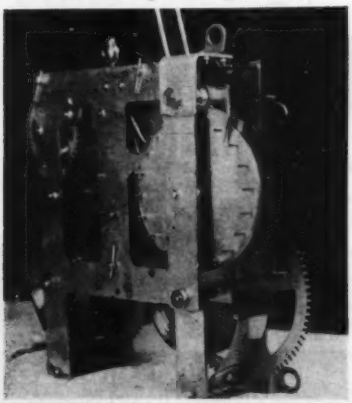


HAM SHIP'S BELL STRIKER.

GLH & JEC.

and use the outer edge of it as the count wheel, cutting the lock-slots as indicated in the inside sketch in Fig. 3.

"The original count wheel of the movement would be discarded, the count finger cut off at the arbor, then the arbor would have to be drilled as near the back pivot as practical and the new count finger, to work upon the edge of the hammer lift-pin disc, inserted in this new hole and brought out the back plate—not a very difficult bit of improvising."



Ham's Ship's Bell Clock

We are grateful to Mr. Ham for sending in this suggestion, appreciate his co-operation, and know that he would be pleased to hear from any one building the Ship's Bell striker. He is to be commended for restricting his project to ordinary tools and materials—this places it within reach of any and all who would like to try it. Let's have more such "suggestions."

CLOCKWISE

Dear Mr. Coleman:

What would the fellows do without you and your help on the problems facing them? I am writing to you for your answers on a few questions, all on the Telechron electric clock containing the M1313 rotor:

(1) What causes the humming sound in electric clocks?

(2) What is the correction to make to stop this humming?

(3) What should one do when the flat pieces that are held together with shellac come apart?

(4) What is the best way to tell that a coil is no good?

(5) Recently I was sent to the hospital with a bad eye infection, and since this has happened, I have become more inter-

ested in clocks. What do you think of a clock repair shop only? This would mean very few watch repairs, since clocks would be the main line.

(6) What are some good clock repair books dealing with questions like the above, and explaining the repair of cuckoo clocks?

(7) Has the M1313 rotor been replaced with a different number?

ROBERT MCENTIRE

Route 2
Columbia, South Carolina

Dear Mr. McEntire:

(1-2) We are dealing with synchronous electric clocks, all of which, of necessity, operate on an alternating current. Most alternating current is 60-cycle, that is, it alternates its polarity sixty times per second. At the zero point between changing from positive to negative, the current must be nil, magnetically. This is the basic cause of what you refer to as a "humming sound." Anything loose or affected by magnetism within or attached to the movement ceases to be attracted when the magnetism is nil. A sort of vibration sets up, and those accustomed to the 60-cycle-per-second alternation will instantly recognize it. Most call it the 60-cycle hum. See that all parts of the clock are tight, that no iron or small steel objects are near the clock. If it comes from, or by the motor, it could be due to wear, and the motor should be replaced. In aggravated cases, it may be necessary to suggest to your customer that the clock be set upon a piece of felt, dresser scarf or other soft material, and not set directly on solid wood.

(3) We do not fully get your meaning here. Probably you refer to the laminated core through the coil. These pieces are held firmly together by bolts. While cores generally have coatings of lacquer or shellac, that is not intended to hold them together.

(4) Rig up a probing line. Secure a regular light socket and a 5-watt or 7-watt bulb from your current outlet. Run one wire to one socket terminal, and take off the other terminal with about a single 3-foot length of drop cord. Let the other wire come directly to about the same length and solder to the two remaining terminals a short piece of stiff copper wire.

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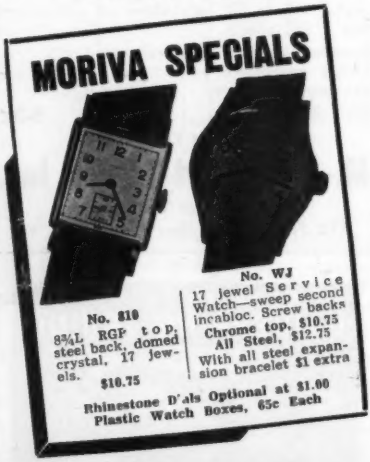
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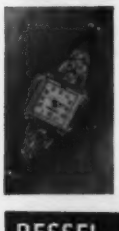

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(5) We've stated a number of times that we are violently biased on this question. We're all for an exclusive clock shop—operate one. So long as you do no watch repair, other watchmakers near you will not hesitate to send you clock customers, as they will know you will not solicit watch work.

(6) By all means get "The Modern Clock" by Ward L. Goodrich and "Practical Clock Repairing" by Donald deCarle (both obtainable from the A. H. & J. book department) if you plan to go in for clocks.

J.E.C.

Dear Mr. Coleman:

I would like to know where to buy fly cutters for cutting gears.

A. W. SNOWBERGER
600 West Main Street
Waynesboro, Pennsylvania

Dear Mr. Snowberger:

Carpano & Pons, Seige Social a Clauses (Hte-Savoie) France, is one of the largest manufacturers of cycloidal cutters, and a letter directed to them will bring a catalogue. Also, write to Mr. Walter Scott, Eureka Time Instruments, 3954 T Street, Eureka, California. They make a line of cycloidal cutters in both high speed and carbon steel, for sale to the trade.

J.E.C.

Dear Mr. Coleman:

Can you give me the address of a collector of old watches? We have two—one is dated 1663, and came from the Firth of Noe, and we would like to sell them.

MRS. R. B. IRVING
1417 Durham Street
Brownwood, Texas

Dear Mrs. Irving:

This column is primarily devoted to clock repairing methods, new tools, etc.,

and is only slightly acquainted with watch collecting. We suggest that you write to Mr. Harry W. Yasseen, 1644 Halstead Street, Chicago Heights, Illinois.

If you have a watch that really dates back to 1663, it is well within the collectors' range, and in all likelihood, would be a desirable piece. As a pretty fixed rule, movements were not dated and I presume that you have the date from the hallmark.

One generally thinks of a firth as being an arm of the sea, or a bay. A quick glance at a map of Scotland fails to show Firth of Noe. I'd be especially interested to know more about this. I regret that the column can't give the exact information desired, but am sure that Mr. Yasseen can.

J.E.C.

Dear Mr. Coleman:

I have an upstairs shop in a 40-story building which has D. C. current. I bought an electric clock, of which I am sending you a picture. As the building has been converting several floors to A. C. current, I figured it would soon come to my place, too, but now they tell me it won't be for a long time. I am thinking of putting a battery movement in the case temporarily, and have been thinking of an "Elite," but would like to ask your advice as to which would be the best.

J. FROGNER

Suite 1237
105 West Adams Street
Chicago 3, Illinois

Dear Mr. Frogner:

We are not familiar with an "Elite" battery-driven movement, and think perhaps you mean "Elix," as marketed by the El Products Corporation, 501 Madison Avenue, New York 22, New York.

This is a jeweled balance, magnetically impulsed; it has micro-screw regulator, and I've found it to be an excellent timekeeper. Its center mounting with one nut makes it easy to install, and in your particular case, makes it ideal for temporary installation, as when you remove it, there will be no holes left.

Our own actual experience has not included a dial as large as the one your picture indicates; however, it seems reasonable to think this movement can drive the hands, as the dial train is ratchet-driven.

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J. E. C.

Dear Mr. Coleman:

A friend of mine has a 16S, 17-jewel pocket watch made by the A. W. W. Company, with the name "Royal" and serial number 7068121. Could you help me give him an idea as to the age of this watch?

WALTER B. BROLIN
104 Cutler Street
Watertown, Connecticut

Dear Mr. Brolin:

The present Waltham Watch Company was officially the American Watch Company from 1859 to 1885. In that latter year the name was changed to "American Waltham Watch Company, the initials indicated on your movement.

They used the name "Royal" for one style and grade of movement, and as near as we can pin-point, the date of manufacture, according to your serial number, is 1895 to 1900—they began the five million in '95 and the eight million in 1900.

J. E. C.

Dear Mr. Coleman:

I have been advised by my jeweler that you might help me locate a works for a grandfather clock for which I would then build a case. It would be desirable if it could be found in the vicinity of New York City, or Philadelphia preferred.

I should like a fairly good works with chimes. I much prefer a weight movement, but if the one I want is entirely out of my price class, I may have to compromise on a good electric model.

R. P. CARTER
429 Manor Road
Beverly, New Jersey

Dear Mr. Carter:

It is a wise thing to do, securing the movement before you build the case. We've seen much grief when it was the other way around.

Write to Meade Brothers, Inc., 1117 Pine Street, Philadelphia 7, Pennsylvania. They are currently stocking English, 8-day,

grandfather movements (antique) complete with pendulum, weights and dial for $35.00 and up. Since you mention that Philadelphia is preferred, possibly you may have an opportunity to go there and inspect their stock.

J. E. C.

Dear Mr. Coleman:

Usually the first article that I read in the American Horologist & Jeweler *is your column. From your comments and articles, I assume you operate a successful clock repair business.*

I prefer to work on clocks rather than watches, but find that either my estimated prices are too high or that there just isn't any room for profit repairing clocks. I use as a guide for watch repairing, the list published by W. O. Smith at Western Pennsylvania Horological Institute — that is, cleaning, $6.00; mainspring, $2.50; cleaning and balance staff, $10.00, etc. I feel that the above prices are fair and are certainly not a "get-rich-quick" scheme.

Customers never seem to complain on their watch repair estimates, yet the same customer will bring in an old mantel clock for repair—for example, I received an old pendulum alarm clock. It hadn't been cleaned or oiled for at least ten years; most bushings were elongated, pivots were worn, bushing holes were full of "muck." In other words, the clock required many hours of work. As previously stated, I like clock work, and I informed the customer that I would fix the clock for about ten dollars — certainly not a profit-making price, but for my own enjoyment I was willing to perform the work. From the customer's reaction, you would have thought that the price was a hundred dollars instead of ten, but he did leave the clock.

As you can assume, many hours were spent before the clock was a good timekeeper. Naturally there was no profit if figured on a business basis, but I did enjoy the job. All customers seem to react the same—clock repair prices are too high. For enjoyment I can repair clocks, but not make a living—so I must stick to watches.

The same rule seems to apply for electric clocks. A clock costing $5.00 comes in with need of a new motor. The cost of the motor to me is almost half the above price, so I can either turn down the job

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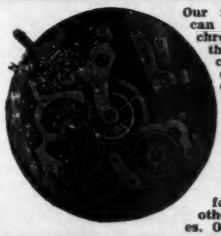

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or replace the motor at cost. Naturally, I turn down the job and suggest the purchase of a new clock.

Now for the question—what is considered a fair price for clock work as compared to prices for watch work? How can customer relations be improved to convince them that the prices are fair? Or is it a case of just not working on clocks?

T. R. ODENATH

5119 H Street, S. E.
Washington 19, D. C.

Dear Mr. Odenath:

Draw up your easiest chair and be sure to obtain an ample supply of matches before filling your pipe, for we are liable to be here all night. This question of clock repair prices is about the hardest one that you could propound. It's close to me, and brother, it's loaded.

First, let me say at the outset that I am *not* going to supply you with any list saying that this job should be so many dollars and that job should be so many dollars—it simply won't work.

Second, possibly as good a comparison as you could make, you have already suggested, i. e., with watch work. However, this cannot be made upon a job for job basis, but rather on an hourly or daily or weekly basis. In other words, why shouldn't the clockmaker's time net him as much, if not more, than the watchmaker's time nets him for the same time? On the whole, it should net him a bit more, but here again we have to be ultra careful in comparisons.

Many, if not most, of today's watchmakers have no right to that title. They are parts fitters, job choosers and speed artists. Now there is no intent to indict the many, many true horologists, and I offer just one point to substantiate my position; I can take you about any city—you name it—and show you shop after shop where the "watchmaker" neither owns nor has a lathe. Some don't even have a staking tool. How does he get by? He chooses the easy jobs, principally mainsprings, cleaning, hands and glasses. Show him a minute repeater and see what he says. Show him any old watch that plainly indicates something bordering upon the difficult and get turned down.

Evidently you are a young man and new, so to speak, in the trade. One does not have to be very old to remember one of the great troubles of the early 1920s, and while this was not actually "repairing," it illustrates exactly the present condition of the repair trade, which after all, is the gist of your question.

Brought over from the last century was the gold-filled watch case. Cases were actually made of metal which had, in a rough manner of speaking, been half-soled with a thin sheet of gold. They were stamped "guaranteed" for 10, 20 or 25 years. Very reputable makers were making them and such guarantees were made good

when the gold wore through in less than the guarantee period. Then the watch case trade was invaded by "sharp shooters" and all sorts of cases appeared, with the various guarantee stamps, and absolutely no regard for the very small amount of gold (if any) used. The hook or catch was that the public, as a whole, never stopped to think that the guarantee was no better than the name behind it. Passing down the street, the shopper would see in one window a certain make and grade of watch in a "20-year" case for, say, $12.50, while possibly in the next block he would face identically the same description on a watch, which looked very much like the other, for $25.00.

This condition grew so bad that the Federal Fair Trade Commission made a ruling that stopped the guarantee system completely. Today, cases must be marked in accordance with definite measures and standards, i. e., if you get one stamped "1-10th 14K gold-filled," you know that one-tenth the thickness of the metal is 14K gold, regardless of what maker's name is there, and if it is marked "gold-filled," it is a thin sheet of gold and not an electro deposit.

There is no definite standard for clock repair work—that is, one that you can easily and definitely show your customer. For example, we examined a grandfather chime clock a couple of days back and submitted an estimate of $75.00. Did the customer hit the ceiling? No, he went right on through the roof—said he had had the clock for umpteen years and it had never been cleaned but twice. The first time it cost $3.50 and the last time, $5.00. We risked a few questions on that $5.00 overhauling and learned that a watchmaker came by the customer's home "after hours," spent some 40 minutes with an oil can "fiddling" inside the clock case, collected the $5.00 and went his way. It had been two or three years back and the owner did not rightly remember how long the clock ran, as it had been stopped for a year or two.

I, for one, am not going to engage in any lengthy argument to convince people of this type. I'm a mechanic; my mission is to correctly repair the clock, not educate its owner as to how it should be done. It cost me like rip to get that sort of an edu-

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cation—why should I give it away? Like the doctor and lawyer, the clockmaker has to literally starve through the beginning years until he has built up a trade. As in the above personal reference, I bluntly and frankly tell the owner that I haven't time to make him any sales talk, as I have customers of long standing already "sold," and I can make much more doing their work than trying to convince him he did not get an overhaul job for a mere five dollars.

The simple truth is that there has been too much of this "running by after hours." Even on clocks brought to the shop, in years recently past, practically all the clock jobs were passed over to the apprentice, and in many instances to the porter for a "gasoline bath" and a good "oil squirting." Such jobs were naturally passed back to the customer at the lowest possible figure on the basis that first, it did not cost the establishment much, and second, by making it look "cheap," it would boost the other business (watch repair and jewelry sales).

I'm all for educating the buying public—but not all at my expense. In the first place, if Mr. John Doe has a fine clock and enough brains to do a bit of consistent thinking, he must know that the man who specializes in that particular type of work is in a position to give him the most for his dollar, that the man specializing in that particular type of work has the best equipment and the best stock of material. Also, that any service man, i. e., one who sticks strictly to the services he renders, has no bargains, loss leaders and old model jobs at a discount.

I can't see any occasion for doing a job at cost, as you mention in the case of the $5.00 electrics. Pass it right back and say, "Get a new one." Now the picture is not so dark, despite all the very evident difficulties. There are many clocks whose owners prize them highly for sentimental or other reasons. Practically everything made prior to World War II is obsolete, thus barring mainsprings, the clockmaker must make any needed part. He has to do whatever is necessary in the way of new bushings, etc., because he cannot rely on the manufacturer. All this requires time. Let's

look at it this way: time is all you have to sell; whether you are in business for yourself or employed, it is the hours you have to sell, and in this light, the time factor is in your favor.

This time factor is the all-important element and you can't give it too much consideration. Arrange your bench, and entire shop for that matter, to eliminate all possible lost motion (save time), obtain proper tools, like a bushing tool, mainspring winder, etc., which are from every viewpoint, timesavers. Most important of all, *do the work right.* This is your living advertisement. Satisfied customers are what bring you the most business.

One of the biggest mistakes the clockmaker makes is his treatment of the job before the owner (customer). It's true, it's just another clock repair job, but never evidence that attitude. Remember that this job is the all-important one. The only job that the customer has, to him, is something quite different from all the others you may have laying around, and it will pay you to remember and practice this.

Back to the price, and I'll close—it's a slow, tough uphill pull, but by steady application, you can make the grade. Watch your take-ins closely. Don't underestimate jobs. To do so is disastrous, for either you must "up" the price above the initial estimate, or "cut" the work to live. One good method is to have double postal cards printed. Tell the customer that to make an intelligent estimate of the work required will require a thorough examination. This examination will probably require more time than they care to wait, that you will send this estimate card with return-card attached, that it will carry the three important items in question (1) what should be done, (2) how long it will take to complete the work, (3) the price, and that the job will be held until the return-card is received, approving the estimate.

Your local five-and-ten-cent store has neat little metal filing cases just postal card size. It will work into a record system, making your booking-up easy. You sort of have to "feel your way." Watch your repair record book closely. Say that you know what your overhead is—just how much you have to take in per day to make

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this grade and show a reasonable profit. Once that figure is more or less established, then you have to translate it into clock repair jobs. Say that you can clean two No. 89 Seth Thomas mantel clocks in the morning, and catch another two in the afternoon. Then you must have your day's pay from these four jobs. Or say that you put two whole days into a grandfather job —two whole days' pay. Pretty soon the repair book will begin to take on a pattern. You will note the percentage of mainspring jobs, etc., and over a period of time, you will be able to work out a profitable list, exactly suited to your needs. (I am sending you a sample postcard.)

If your Clockwise and Otherwise can be of further assistance, do not hesitate to drop us a line.

J. E. C.

Dear Mr. Coleman:

I read your column and I get lots of help from it. I would like, please, if it is possible, to have information about a watch by the name of Stauffer, who the manufacturers are, or anything concerning the watch. The Newall catalogue has a listing of the Stauffer on page 57.

LAWRENCE L. PARSONS

Route 1
Southbury, Connecticut

Dear Mr. Parsons:

We are unable to locate a Stauffer watch in a trademark list. However, I must point out that since your Clockwise and Otherwise is primarily concerned with clocks, we do not have very much on watches.

M. H. Stauffer Company at 55 East Washington Street, Chicago 2, Illinois, advertises 7-jewel and 17-jewel, 14K, gold-filled and stainless steel watches, pocket, wrist, Braille, alarm and automatic, to wholesalers. It is quite possible that this firm imports and places their name on some of the watches.

We do not locate a Stauffer watch in The Watchmakers of Switzerland listing. Stauffer & Son Company at 13 Charterhouse Street, London, E. C., England, advertises watches. Their trade names are "Peerless," advertised as the perfect watch, and "Peertone" as second to none.

The column does not have a Newall catalogue in the files, but I am sure that a letter addressed to them, Newall Manufacturing Company, 9 Maiden Lane, New York 38, New York, will bring you the manufacturer of the watch you note as being listed in their catalogue.

J. E. C.

Dear Mr. Coleman:

I should appreciate your sending me a list of clock books, covering any kinds of clocks, including foreign-made clocks. I am placing an order with the A. H. & J. Book department for Brooks Palmer's "The Book of American Clocks."

ERNEST F. KRONER

T. C. A. in Indonesia
c/o Mail Room, U. S. State Department
Washington 25, D. C.

Dear Mr. Kroner:

Glad to have your letter—believe it to be our first from Indonesia. Why not another one telling of the clock repair trade in your country?

You say "clock books," but do not indicate whether you desire history and listing or something on repairing, so we shall mention a few of both. The Brooks Palmer book you mention falls in the first group, and so do the following:

"It's About Time," by Major Paul M. Chamberlain, out of print and a bit difficult to get, but still available and an excellent history. It groups various parts like regulators, escapements, etc.

"American Clocks and Clockmakers," by Carl W. Dreppard, 312 pages, list price $4.00. In addition to the historical text is a 7,000-word glossary and a 20,000-word listing of important American makers.

"Six Quaker Clockmakers," by Edward Chandlee, 280 pages, 160 illustrations, $10.00, historical and biographical sketches.

"Watchmakers and Clockmakers of the World," by G. H. Baillie, $10.00, 35,000 listings between the 14th century and 1825.

On the repair and maintenance side are:

"Science of Clocks and Watches," by Dr. A. L. Rawlings, 303 pages, illustrated, $5.00, covers the theory and history of watch and clockmaking.

"Watch and Clockmakers Handbook," by F. W. Britten, 347 pages, illustrated, $6.00, a reference volume for bench problems.

"Electrical Timekeeping," by F. Hope-Jones, 279 pages, 130 illustrations, $6.00, a comprehensive text on the subject of electric clocks.

"Horological Hints and Helps," by F. W. Britten, 368 pages, illustrated, $3.50, revised and enlarged second edition.

"Clockmaking Past and Present," by G. F. C. Gordon, 265 pages, illustrated, $5.00, diagrams and plates of long case, bracket and other clocks.

"Clock Jobbers Handy Book," by P. N. Hasluck, 164 pages, illustrated, $2.00.

"Clock Repairing and Making," by F. J. Garrard, 168 pages, illustrated, $2.25, a practical book dealing with tools, material and methods used in repairing.

"Practical Clock Repairing," by Donald DeCarle, 239 pages, illustrated, just released.

"The Modern Clock," by Ward L. Goodrich, (reprint), $4.95.

"Precision Time Measures," by Charles T. Higganbotham, (reprint).

"The Watchmaker's Lathe," by Ward L. Goodrich (reprint).

The last two books are now on the press and are to be released soon.

"The Watchmaker's Lathe," by Donald DeCarle, 153 pages, illustrated, $7.50.

We believe the book department of the *American Horologist & Jeweler* can supply all of the above. Mr. Malcolm Gardner, 12 Earnshaw Street, London, W. C. 2, England, a horological book dealer, has just issued a new catalogue, No. VII. We believe a copy can be had direct for 35 cents. A Gardner catalogue is always a definite addition to any horological library. I am looking forward to hearing from you again.

J. E. C.

FIRST WATCH SHOP

Somewhere between 1797 and 1800 Roger Finster opened his watch repair and jewelry shop in lower New York City. He was apparently the first of his craft to open a shop in this city. Finster found that while there were many in New York who owned jewels and watches there was little need for his services. At least not enough to keep him going the year round. To supplement his income Finster utilized his talents to manufacture toys for youngsters and games for grown-ups. He also repaired musical instruments. It wasn't until about 1812 that Finster's watch and jewelry business reached a satisfactory volume.

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Pennsylvania, New England Clockmakers

By Samuel Huntington Barrington

This is another in the series of talks given at Sturbridge, Massachusetts, at the 1952 annual meeting of the National Association of Watch and Clock Collectors, an organization of those interested in any phase of timekeeping. The organization now has over 1,200 members, and a cordial welcome awaits new members. Local chapters of the national organization have been established in Philadelphia, New York, Chicago, Los Angeles, Detroit, York (Pennsylvania), Baltimore, Washington, D. C., New England, and Tokyo, Japan, for frequent meetings. The Association's monthly mailing alternates between the Bulletin and the Mart. A pamphlet giving details about the Association can be obtained by writing to the American Horologist & Jeweler.

Samuel Huntington Barrington was born March 20, 1892, in a village on the outskirts of Harrisburg, Pennsylvania. He attended private schools and later the Technical High School.

Fascinated by any kind of machinery, he found clocks the most accessible, and consequently, no clock in the family home was safe unless put well out of reach. In spite of these precautions some of the clocks were reached, and as a result, his father canvassed the neighbors for cast-off clocks and took them home to his son.

A few hundred clocks later, at the age of 12, Samuel Barrington was able to do a good repair job on the average timepiece. His first job for pay was for a neighbor whose tall clock he made into an 8-day timekeeper. Mr. Barrington reports that the work was done "the hard way." The clock stood on a landing half-way up the stairs. The young repairman cut a hole in the bottom of the clock, a hole in the floor, another hole in the floor of the closet under the stairs, and made about two thousand links for the chain.

Frequent stops at the shop of a local repairman, whose father had been trained by Simon Willard, furthered his education, and before long the repairman was paying his student a dollar for a week's work, consisting sometimes of cleaning and oiling a dozen watches.

Samuel went to Sunday School regularly, sang in the choir and learned to play the organ. He recalls that because the organist was a large man and he was a small boy, he was often called upon when the organ needed repairs. He could be pushed into the tight places.

Automobiles were the next machines claiming his attention, and he rigged up a lighting system for the family car long before such equipment became a part of the automobile. After graduating from high school, he went into the auto repair business, continuing until World War I, when he was the first to be drafted from his district. On the way to induction he was run down by an automobile. He spent 18 months in a hospital and left it on crutches and wearing a brace. Then he took a job playing the piano in a movie theater, later playing the organ until 1923, when the theater burned down.

He took to organ repairing after that, and is still building and repairing them. But Mr. Barrington has never given up his first love, and through the years has acquired about 600 watches and 250 clocks. He lives on a farm that was once a part of the J. D. Custer place, adjoining the David Rittenhouse farm.

IF I leave out any clockmaker of fame, possibly of more fame than some mentioned here, it is not intentional. I do not hold those of whom I speak above all others—I simply know more about these men than some others, and I offer them as examples. These are all makers on whose clocks I have worked. In my talk on Pennsylvania and New England clockmakers, it is my intention to touch on styles and ingenuity of the makers, not on the merits or demerits of one over the other. As you know, all the old-timers were better than good, which in fact, is borne out by the vast number of old clocks which are still running well.

In New England you had a first in Benjamin Bagnall, who made tall clocks and made darned good ones, and subsequently tutored many of fame who were to follow. It is possible he learned clockmaking in Philadelphia from Peter Stretch,

who was his good friend and whom he visited often.

Then there was Daniel Burnap who taught Eli Terry. And Terry, who was not only the first to make clocks in volume at a price all could afford, but also the inventor of the interchangeable parts system, whereby every part was exactly alike. He was a mechanical genius and thoroughly understood and put to use all the secrets and mysteries of horology and its principles.

Then there were the Willards, who not only made the best that could be made, but designed and originated many beautiful styles including the "banjo." Curtis, Claggett, R. T. Manning, Thomas Harland, G. Roberts, Seth Thomas, R. Whiting, and T. Hoadley were among a host of others.

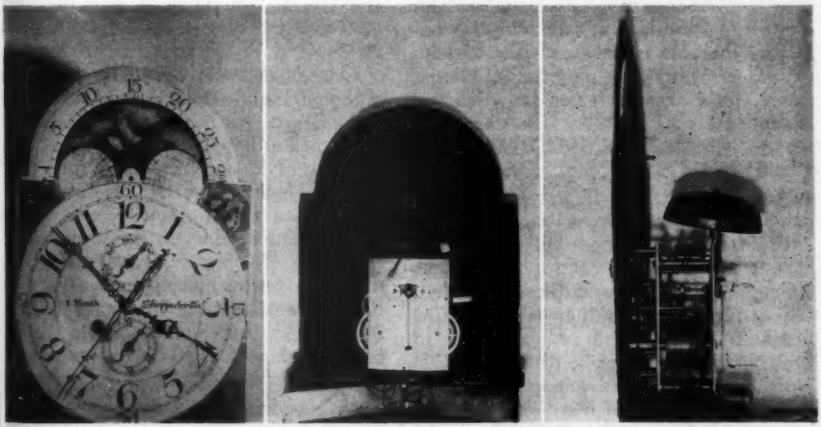
The Massachusetts type of tall clock has never been surpassed for real grace and beauty. Outstanding examples are to be found in Willard and Taber clocks. It would be impossible to touch on all the styles of all the case designs—there were thousands of them, some very beautiful ones, particularly those of Terry, Ingraham, Jerome, and many others. The painted glass tablet was born in New England. At one time it adorned all the shelf clocks.

New England also produced one different than all the rest, one Joseph Ives. This man has my vote. He not only made good clocks the accepted way, but he invented all kinds of improvements and all kinds of methods not heretofore used to make clocks run—the roller pinion, the roller escapement, the wagon springs of many types were the inventions of this genius. One of the best was the Bishop and Bradley brass clock. They were hard to beat, and then, what is more beautiful than a New Hampshire wall clock? I have never owned one, but I hope to some day.

Not only were our clockmakers good mechanics and good business men, but many were outstanding patriots who fought the British so that our nation might live. The nation owes a debt to New England genius for giving us clocks, good ones, at a price all could afford.

Before I touch on Pennsylvania clocks I want to put in a plug for Munger of New York. His clocks were tops mechanically, and some styles were fine, too.

In Pennsylvania, we start with the arrival of Abel Cottey, in 1682, who started making clocks soon after his arrival from England. It is believed he constructed the fist clock actually made in America. They were of the square-dial, flat-top variety.



(Left) The dial of the I. Smith clock. (Center) Back view of the clock, where the name "J. Wilbank" can be seen on the back plate. (Right) Side view of the movement. Note that the escape wheel is in the center of the movement. The wheel which is normally in the center is above the main wheel, extending through the plate, and driving the motion work. It also has the setting clutch on this arbor. The hour wheel rides outside a tube mounted on the front plate, and the pivot of the escape wheel rides inside the tube, extending out through the minute hand, where the sweep hand is mounted.

His cases were well done. Some of his clocks are still in use and running well. The first clock had but an hour hand. The later clocks had two hands, and all had the recoil anchor escapement.

Philadelphia had many fine makers, some famous—Peter Stretch, Edward Duffield, Joseph Wills, S. Lukens, William Houston, Christopher Souers and many others.

In the year 1732, in what is now a part of Fairmount Park, was born David Rittenhouse, who was to become one of the nation's most famous men. He was of Mennonite parents and strictly brought up. His father built a house in East Norriton township and David went there to live. While there, he inherited a set of tools and a book on astronomy, which were the beginning of his mechanical ventures. His father soon learned that David was not going to become a farmer, and soon after that, David made his first clock. Rittenhouse not only made fine clocks, but complicated ones—in fact, the most complicated one ever made in this country. It is the orrery which he made up for Pennsylvania University. This clock is now housed in Drexel Institute.

He was also a surveyor, and surveyed the Ohio-Pennsylvania boundary, the New York-Pennsylvania line and the Mason-Dixon line. He made long visits to John Gorgas at Ephrata, Pennsylvania. Gorgas was a clockmaker of fame. It is believed Rittenhouse may have got his start from Gorgas, who later married David's sister, I believe.

After the war, David moved to Philadelphia and built a home at Seventh and Arch Streets. The house still stands and bears a plaque with its history on it. Rittenhouse was the first treasurer of Pennsylvania. He supervised the making of the first coin of the realm and currency. In 1767, he gave a corner of his land in East Norriton to the Presbyterian Church to put up a building which still stands. This has recently been restored to its original form. It is about a mile from my home in East Norriton township.

Now we come to Jacob Custer. He was the Joseph Ives of Pennsylvania, and although he was more successful than Ives financially, he was never as well known. He was self-taught. He was an inventor of real genius. Every time he had an idea of how to make a clock work differently, he would sit down and make it. I have found four totally different types of strike mechanisms in his clocks.

It is my opinion that he must have had a German wag in his home, as his first clocks had top and bottom plates, with upright knock-out strips all made of wood, and with brass bushings for the pivots. I have his No. 2 clock, as well as three later ones.

His escape wheel was different than the rest of the wheels; the teeth were perfectly straight, and the anchor had the impulse edge on it to make it go. I said he used four different strike systems, and two, I am sure, were his own. I described these in our Bulletin No. 29. Custer invented many other things not connected with clocks. He also made many tower clocks, many of which are still in use.

My home is on part of the Custer farm. His home is just down at the end of my property. His father had 780 acres bounded on the west by the D. Rittenhouse farm. David Rittenhouse died in 1796, and Custer was born in 1805, so they never knew each other, although Custer's father knew Rittenhouse. Maybe a little of the clock germs rubbed off from one farm to the other.

Custer's cases on his shelf clocks were of the pillar-and-scroll type, possibly copied from Terry, but more likely from Dan Rose of Reading, who made a tall clock in 1771. I know where there are two of them with moon dials. Both Rose and Custer used a burl-grained panel in place of the painted tablet in the lower part of the door. His first cases were all cherry, the later ones, mahogany and walnut. The dials were all similar in the later clocks, all having a basket of flowers in the arch of the dial, with shells in the corners.

Many styles of cases were used in tall clocks made in Pennsylvania, but the favorite seemed to be the broken arch scroll-top. The Reading and Lancaster casemakers seem to have hit a more artistic average on this type.

Between 1770 and 1800, there was a cabinetmaker in Reading who, to me, has

all of the others beaten a mile for artistic proportion and workmanship. Who he was is a mystery, but many clocks by Rose, Keim, Hahn, Whitman, Oyster and Wildbahn display a style and constructional technique common to each other, and different from all the rest.

Lancaster County had Shreiner, Bachman, Heintzelman, and Jacob Eby of Manheim. York had Fisher, and many other fine makers, and all these Pennsylvania makers used an almost exclusive feature. That is the sweep second hand. J. Wilbank of Philadelphia used it also.

Another Pennsylvania feature was the free snail. The snail could be turned by moving the hour hand alone, thus eliminating the necessity of striking the clock around to set it.

J. Wilbank was a bell founder in Philadelphia, and was famous as one. His clocks are scarce. After the Liberty Bell cracked, he was given the contract to cast a new one. He was to receive the old bell as part payment for scrap metal. He cast a new bell, but never received the old bell, and it's actually property of his descendants.

A word about the Wilbank clock (illustrated on page 65)—it is finely made, with heavy plates, well cut wheels, and is the equal of any of that period. This one was made between 1800 and 1820. The I. Smith, whose name is on the dial, conducted a general store and he also was an undertaker of that day. He may have made the case, which is a work of art, containing many kinds of wood and very well joined.

I stated before that J. Wills originated the sweep hand. I want to change that to say that he was the first to use it, to my knowledge.

Pennsylvania makers made more cased grandfather clocks than all the others together. Keim of Reading made over five hundred; Rose, three hundred; Hahn, four hundred and fifty; J. Cope of Watsontown made over four hundred; Bixler of Easton has in his Easton record, over three hundred names of people for whom he made clocks and there were hundreds more makers.

Some of the cases were pretty terrible. On that point, I don't think I will have any argument. But as I said in the beginning, New England or Pennsylvania clocks were all good.

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LOUISIANA WATCHMAKERS ELECT OFFICERS

Douglas J. Givens of Shreveport was elected president of the Shreveport-Bossier (Louisiana) Watchmakers Association when guild members held their October meeting. Eugene E. Clark of Shreveport was named vice president, and Fred C. Strange of Shreveport, secretary-treasurer.

Elected to the board of directors were J. W. Crutchfield, J. M. Martin, F. A. Givens, J. W. Bryan and Curtis Runnels. Officers are to be installed this month, and J. P. Romain, president of the Louisiana Horological Association will act as installing officer.

CLOCK COLLECTORS ATTEND ILLINOIS GUILD MEETING

The Mid-West chapter of the National Association of Watch and Clock Collectors met with the Illinois Watchmakers Association when Illinois guild members held a recent meeting at the Jewelry Training Service school in Chicago.

A short technical discussion on Swiss chronographs was followed by an auction of antique and unusual watches and small clocks.

Students of the Jewelry Training Service school were also guests at the meeting.

IOWA ASSOCIATION HOLDS SUCCESSFUL CONVENTION

A large and enthusiastic group of watchmakers were present for the annual convention of the Horological Association of Iowa held in Des Moines in September.

Delegates heard a report by Arnold King, chairman of the Iowa Board of Examiners in Watchmaking, who said that the state now has 1,155 registered-licensed watchmakers as compared to last year's 1,204. There were 69 examinations given and 45 licenses issued during the past year.

Other convention speakers included Dr. Paul W. Thielking, who spoke on "Visual Hygiene for the Watchmaker," and Ben Stolpe whose talk dealt with merchandising techniques.

Present officers hold over for the coming year. They are William L. Braklow, Des Moines, president; Milton E. Roth, Waterloo, vice president; and Hoyt D. Snyder, Humeston, secretary-treasurer.

E. L. Berner of Fort Dodge, Ia., was honored at the convention and as a token of appreciation, he was presented with a beautifully engraved, solid gold, Life Membership card. The Horological Association of Iowa feels that Mr. Berner has done more than anyone else to raise the standards of watchmaking and watchmakers in his state. Mr. Berner was the first president of the Iowa association and the first chairman of the Iowa Board of Examiners in Watchmaking, where he served six years.

LADIES' AUXILIARY FORMED TO SUPPORT DES MOINES GUILD

Mrs. Florence E. Hogg, wife of George T. Hogg, vice president of the United Horological Association of America, has been instrumental in forming the Capitol City Guild Ladies Auxiliary in Des Moines, Iowa. The October meeting was the third session for the Auxiliary, and attracted 20 paid members. The organization has been named the Tempus Club.

and Mrs. Charles Dean Crank is its first president.

The chief purpose of the Auxiliary is to stimulate attendance and membership gain for the Capitol City Guild, and to build up a treasury fund for the Guild's emergencies.

TEXAS WATCHMAKERS CONSIDER PROFESSIONAL SECRETARY

The Texas Watchmakers Association has circulated a letter among its membership for opinions concerning the hiring of a fulltime executive secretary to organize and promote the watchmakers of the state of Texas.

In a test action, an Association committee discovered that watchmakers in the Lubbock area were willing to contribute $10 to a fund to meet the expenses of an executive secretary's office for one year. It was estimated that the operation of such an office for a year would cost $10,000.

The proposed secretary's prime job would be to get needed work done which the elected officials of the Association have no time to do.

LONG BEACH MEMBERS HOLD 'HAMBURGER FESTIVAL'

The Long Beach Guild of the Horological Association of California held its annual "hamburger festival" recently at a Long Beach park, with wives and friends of members as special guests.

President Ray Fawcett was chief cook and was assisted by Lee Troussant and Howard Nixon. The evening's entertainment was planned by Morris Wolf, state vice president, and Mrs. Howard Nixon was in charge of a special program planned for the ladies while guild members were attending a business session.

NEW JERSEY GROUP HEARS TALK ON REPIVOTING

James O'Shaughnessy was the guest speaker at a recent meeting of the Watchmakers Association of New Jersey at the Ivanhoe hotel in Irvington, and talked to the group about repivoting. Mr. O'Shaughnessy is an expert in that line and gave some valuable pointers and better methods in that phase of watchmaking. At the close of his talk he answered questions brought up by members.

• • •

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GUILD MEETING DATES

CALIFORNIA

Long Beach Guild:
Fourth Wednesday of each month
Los Angeles Guild:
Third Wednesday of each month, 8 p.m. No meetings in August or December.
Election in November

IOWA

Des Moines Capitol City Guild Auxiliary:
First Wednesday of each month.
Cedar Rapids Watchmakers Guild:
Third Thursday of each month. No meetings July, August and December.
Fort Dodge District Watchmakers Guild:
Second Tuesday of each month. No meetings June, July, August or December.
Northwest Iowa Watchmaker's Guild:
Second Tuesday of each month. Meeting place rotates Storm Lake to Cherokee to Spencer
Waterloo Watchmakers Guild:
Second Thursday of each month. No meetings, July, August or December.

LOUISIANA

Alexandria Watchmakers Guild:
First Wednesday of each month,
Baton Rouge Watchmakers Guild
Second Tuesday of each month.
New Orleans Watchmakers Guild:
First Monday of each month.
Shreveport-Bossier Watchmakers Association:
First Thursday of each month.
Southwest Watchmakers Guild: St. Charles
First Wednesday of each month.

MARYLAND

Horological Guild of Baltimore: Last Wednesday of each month.

MICHIGAN

Greater Detroit Horological Society: Second Monday of each month, 8 p. m.

MINNESOTA

Minneapolis Watchmakers Guild: Second Wednesday of each month. No meetings July, August and December.

NEW HAMPSHIRE-VERMONT

Twin States Watchmaker's Guild: Lebanon, N. H., second Monday of the months of April, June, September, November, 8 p. m.

NORTH CAROLINA

Winston-Salem Watchmakers Guild: Second Thursday each month, 7:30 p. m.

OKLAHOMA

Oklahoma City Watchmakers Guild: Third Friday each month, 6:30 p. m. No meeting July and August.

SOUTH CAROLINA

Columbia Watchmakers Guild: Second Tuesday of each month.

Rock Crystal Watches

(Research by Dr. Small of New York City, taken from the Scientific American, 1888.)

A new and peculiar class of timepiece has lately been brought out by the Waltham Watch Company, which illustrates the steady progress that is being made in the arts of skill and precision. This is a watch of ordinary size, of which the case and plates are made of Brazilian pebble or rock crystal, thus rendering the watch transparent, and exposes to plain view the wheels and all other parts of the internal mechanism.

Watches of this kind are now kept in regular stock by the Waltham company, and as to timekeeping, they possess the usual superior excellence for which all Waltham watches are now celebrated. The rock crystal watch is, we understand, the result of the special skill and genius of Mr. William R. Wills, who for the past 31 years, has had charge of the jeweling department of the Waltham Watch company. He has discovered a new and rapid mode of cutting crystals and gems of all kinds, by which the lapidary's art is greatly facilitated. Operations heretofore requiring two-months' time are now reduced to two hours.

Mr. Wills seems to have learned how to carve, cut, and bore the hardest stones with as much facility, certainly and precision as if the material were so much brass. He will, for instance, take a 6-inch block of rock crystal and in a couple of hours cut into sheets of any desired thickness or from the same block, cut out the center of the casing or solid ring for a watch case. We lately examined one of these new rock crystal watches. The center of the case is of rock crystal, in one piece. It is bored for the stem and stem winder, which is secured therein by clamping screws. It is also bored for the push-pin, by which the winding and setting mechanism is operated. The two plates of the watch, between which the wheels rotate, are made of rock crystal. The pivots of the balance bridge, the pallet bridge, the center wheel, and the escape wheel are set in rubies, and these rubies are set in sapphires, which latter are set in the crystal plates, these settings being secured to the plates by friction. There are, in all,

12 sapphired settings, each carrying a ruby setting. The pivots of the barrel and crown wheel run in the crystal plates. The plates are held apart by sapphire pillars, through which screws pass. The balance bridge and pallet bridge are made from rock crystal, the push-pin of chrysolite. For the various screws and settings, there are 38 holes drilled in the crystal plates. The dial is made in the form of a skeleton of gold. Above each hour mark is a diamond and between the diamonds is a ruby for each minute. The diameter of the rock crystal plate is one and seven-eighths inches. The front and back of the case is composed of a crystal plate; thus constructed, the watch is transparent and may be used as a slide for a projector.

Altogether it is a unique and attractive article. Another of the watches which we examined has its front plate made of red agate and presented a very beautiful appearance.

—Submitted by Mr. Barny, associate editor A. H. & J.

ORIGIN OF FISH-SHAPE JEWEL

The first symbol of the early Christians, shortly after Christ's death, was not the cross, but a crudely drawn fish. Christ had been a carpenter, not a fisher, unlike most of the others, but He had been the Savior of the poor who lived principally on fish which were inexpensive. When His doctrines spread through Greece and Rome and entered the homes of the rich they too adopted the fish, generally in the form of a fish-shaped jewel in a ring, as their means of identification to one another. Many of the jewelers working on these rings were converted to the new faith by their clients.

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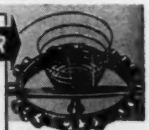

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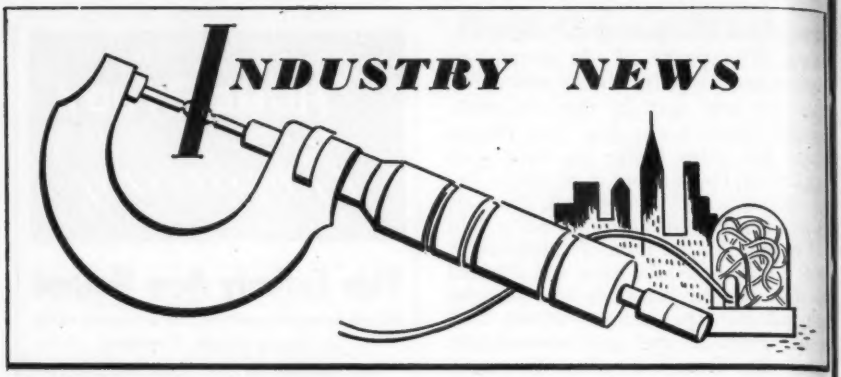

JEWELRY TAX COMMITTEE PLANS NEW EXCISE ACTION

The Jewelry Industry Tax Committee will take no direct action before election to secure relief from the excise tax. However, it plans to resume the fight as soon as the new Congress convenes. The Tax Committee will again call upon jewelers throughout the country for the same wholehearted and helpful cooperation the trade has provided in the past. In order to obtain full consideration, the industry should be unified and the Jewelry Industry Tax Committee earnestly asks for the cooperation of all. Proper timing of steps to be taken is paramount, and the committee will endeavor to keep the industry advised when and what action jewelers should take.

DEATH CLAIMS C. M. KENDIG OF HAMILTON WATCH CO.

Calvin M. Kendig, retired president and chairman of the board of the Hamilton Watch Company, died Tuesday, October 14, in Johns Hopkins hospital, Baltimore. He was 75.

Mr. Kendig was associated with Hamilton for 50 years until his retirement in April, 1951. He began his career with the watch firm in 1902 as head bookkeeper. Later he was transferred to the cost accounting department. He became purchasing agent; secretary to the board of directors, and then assistant treasurer in 1920. He was elected a director in 1921, secretary and assistant treasurer in 1924, and first vice president in 1931.

In April, 1939, Mr. Kendig was elected eighth president as well as treasurer of the company. He retired from the presidency of Hamilton, April 13, 1948, but was elected chairman of the board at that time. He retired from the chairmanship of the board of directors in April, 1951.

DECISION NEAR IN WATCH INSPECTION TIME CONTEST

Selection of the 14 winning entries in the fourth annual Watch Inspection Time Contest is expected shortly, according to Paul Tschudin, director of the Watchmakers of Switzerland Information Center in New York.

The panel of seven judges, made up of the presidents of national jewelry and horological trade associations, is now considering the best of the hundreds of entries received in the Swiss-sponsored competition. Winners will be determined within the next few weeks. Names of the 14 lucky jewelers and watchmakers chosen to share the $1,000 in prizes will be announced in the December trade press.

Entries were received from 38 states, the District of Columbia, Hawaii, and Newfoundland.

HELP THE SHOPPER, BUSINESSMEN URGED

The hapless American shopper of today was described as wandering through a "jungle of merchandise" and forced to make his own selection without adequate guidance from retail salespersons.

Members of the Michigan Retail Jewelers Association heard this estimate of U. S. salesmanship recently from T. J. O'Connell of Chicago, midwest regional manager of Elgin National Watch Com-

pany, at a seminar on selling conducted by Michigan State College.

"The self-service idea has its merits in food merchandising and certain other fields," O'Connell conceded. "But too many jewelers, appliance dealers and haberdashers are losing valuable sales because their retail clerks are encouraging involuntary self-service—the practise of letting the customer shift for himself."

O'Connell estimated that "untold millions of dollars" in retail sales volume are being lost each year through poor retail selling. But he added that in most cases it isn't the clerks' fault because they've never been taught how to help the customer.

"Overcoming this handicap is the biggest job facing business today," he warned. "America cannot possibly maintain high productivity after the armament program levels off unless there is efficient and effective selling at the point where potential customers are exposed to merchandise."

WAKMANN ANNOUNCES NEW RESERVE POWER INDICATOR

Icko Wakmann, president of Wakmann Watch Company, Inc., 15 West 47th Street, New York 36, revealed on his return from Switzerland in September that major innovations would herald the company's line for 1953. Prominent in the Wakmann plans is the incorporation of a reserve power indicator in all self-winding models.

"Our sales of self-winding watches have always been high," Mr. Wakmann stated. "Increasingly, America is living in an automatic, mechanized age. Self-winding watches are definitely wanted by the public. I am confident that jewelers will find our new feature a decided stimulant to profits."

Pointing out that people's habits are deeply ingrained, Mr. Wakmann remarked that the vast majority of automatic watches must run on reserve power during owners' sleeping hours.

"People take off a self-winding watch, on going to bed, just as they take off a conventional watch," said Mr. Wakmann. "It is natural therefore to wonder, on arising, whether a self-winding watch is sufficiently wound. Our new indicator will tell at a glance the number of reserve hours' run-

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ning time."

A highlight of the Wakmann Watch president's trip abroad was a tour of the company's manufacturing facilities. There is impressive evidence, said Mr. Wakmann, that Swiss watch designers' ingenuity will continue to solve challenging problems and create new types of timepieces.

The new Wakmann self-winding chronograph is a specific example, according to the Wakmann president. "We do not yet know the exact date when this chronograph will be ready," he said, "but virtually all the engineering has been completed. Some time in 1953, we hope to present to jewelers and their customers this significantly new chronograph."

In regard to the development of new styles of other watches, Mr. Wakmann emphasized that style preferences are not always national.

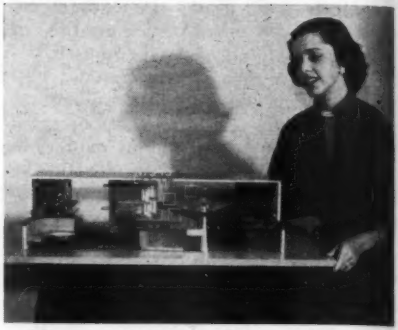
"We believe," said Mr. Wakmann, "that jewelers must have full opportunity to obtain styles that sell best in their own localities. We will introduce many new models of dress, sport and specialty watches during the months to come. The procurement of these styles was one of the purposes of my trip abroad."

Shipments of these new models, Mr. Wakmann indicated, are already en route to the United States, and will shortly be in the hands of Wakmann dealers.

AMERICAN TIME WARNS AGAINST FRAUDULENT SALESMEN

According to American Time Products, several instances have occurred where a man (or men) travelling across the country, has offered WatchMaster Watch-rate Recorders for sale at ridiculously low prices, representing the instruments as government surplus or obtained through other sources. It is alleged that the usual procedure is to collect a down payment of 10 per cent, promising shipment at a later date. No deliveries have been reported by those who provided this information. No departure from established price is authorized by the manufacturer through its salesmen or representatives. This is a warning to be sure of the identification of any person offering WatchMasters for sale. If any suspected impostor is encountered, write, giving all details to American Time Products, Inc., 580 Fifth Avenue, New York 36, N. Y.

ELGIN SHOWS MODEL OF TOMORROW'S JEWELRY STORE



Here's a miniature of the model jewelry store prepared for the ANRJA convention in New York by Elgin National Watch Company and its subsidiaries, Wadsworth Watch Case Company and the Hadley Company, Inc. Using the newest materials and most advanced architectural trends, the exhibit places particular emphasis on merchandising through adroit use of point-of-sale materials.

TRIBUTE PAID R. E. THOMPSON, LATE PRESIDENT OF GILBERT

Ralph E. Thompson, connected with the Gilbert Clock organization for more than 26 years, and its president since 1934, whose death occurred in mid-September, was paid tribute in a recent editorial published in the Winstead (Connecticut) *Evening Citizen.*

The writer says, in part:

"Assuming the presidency of the William L. Gilbert Clock Corporation at a most difficult time in its history, his were the decisions and sound forward-looking policies which developed the clock company into one of this area's most progressive firms. Mr. Thompson had a rare talent for sympathetic understanding of what is generally known as "human relations," for he knew people, liked people, understood their ways of thinking and their ways of life . . . Every clock company employee worked with the knowledge that should any honest difference arise, the doors of top management's offices were always open

and he could have a face-to-face discussion of his problem under conditions which recognized his dignity as an individual . . . A mutual labor-management understanding of each other's problems and aspirations has been notable in recent years at the Gilbert plant which, to a great extent, has set the pace in this respect for all local industry."

'53 JEWELERS' BUYERS GUIDE READY FOR SALE

George Barnard and V. L. McKernin, publishers of the Jewelers' Buyers Guide, 1819 Broadway, New York, N. Y., announce the 1953 issue of the Jewelers' Buyers Guide is off press. The new, completely revised "Source Encyclopedia of the Jewelry Industry," has over 930 pages and contains hundreds of new sources of jewelry supplies and services plus new illustrated lines, prices and available catalogs, which should answer constant queries of retailers, manufacturers, and wholesalers as to "who makes it," "who sells it," "who services it."

There are up-to-date names, addresses and telephone numbers of over 8,000 jewelry manufacturers, wholesalers, importers, repairers, and service organizations, plus many other allied lines. Thousands of changes have been made from prior editions, also many new features such as important gem data, watch information, and postal regulations have been added in addition to a complete revision of the popular Trade Name and Trade Mark Section.

All lists are indexed, cross indexed and arranged alphabetically by city and state in 56 separate merchandise and service classifications.

There has been no change in the subscription price of $3, and according to Circulation Manager Morton Scheman, demand has been so great above the regular subscription list that orders will be filled on a first-come, first-served basis as checks and money orders are received until the stock is exhausted.

PENNSYLVANIA INSTITUTE ISSUES FREE PRICE LIST

The Western Pennsylvania Horological Institute of Pittsburgh, Pennsylvania, has furnished price lists to watchmakers and jewelers in Pennsylvania for the past ten years, free of charge, and any watchmaker desiring a copy of the list, may obtain one without cost by writing to the Institute at 807 Ridge Avenue in Pittsburgh, according to a recent announcement by H. L. Evert, Institute dean.

The list covers wrist watches, pocket watches, charges for cleaning and adjusting complete chronograph watches, such as hour and minute registers, various named chronographs and calendar watches, day, date, month and moon-phase, etc.

FASHION ACADEMY GOLD MEDAL AWARDED TO JACOBY-BENDER

The Fashion Academy Gold Medal, for beauty and fine fashion-styling, was awarded to J-B Watch Bands on September 19. The presentation was made by Mrs. Emil Alvin Hartman, director of the Fashion Academy, to Mr. Max Jacoby, president of Jacoby-Bender, Inc., at a luncheon held at the Waldorf-Astoria hotel, in the famous Peacock lounge.

In presenting the medal to Mr. Jacoby, Mrs. Hartman said,

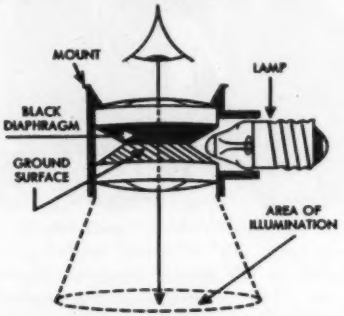
"You have accented the functional importance of watch bands with smart and lovely design; you have endowed them with definite fashion personality and have given them importance as a glamorous style accessory. J-B Watch Bands are a perfect co-ordinate to a smart watch and a lovely complement to a best-dressed appearance."

In accepting the medal, Mr. Jacoby said that he was doing so, not only for himself, but also on behalf of the many men and women in the J-B organization without whose help this high honor might not have been achieved. J-B is the first watch attachment ever to receive this distinction.

The luncheon was attended by important representatives from the leading trade papers and many fashion editors representing famous weekly and monthly publications read by both men and women.

Jacoby-Bender, Inc., will feature the Fashion Academy Gold Medal in all of its trade paper and national advertising, throughout 1953. It is planned to commemorate this honor with the introduction of several new watch bands, both for men and women, that have had the indorsement and acclamation of the fashion editors who had a preview of these models.

BAUSCH & LOMB ANNOUNCES NEW TYPE MAGNIFIER



A new, inexpensive, 10-power magnifier that can be clipped to the pocket like a fountain pen was announced recently by Bausch & Lomb Optical Co., Rochester, N. Y.

The company said the magnifier, which uses two penlight batteries and bulb for illuminating the object, is designed for on-the-job inspection of small parts, castings, small joints and welds, reading micrometer and other fine scales, and similar shop and laboratory uses.

Weighing only two and one-half ounces, including batteries, the magnifier employs a unique lens construction which allows the light from the bulb to go directly through the lens and onto the object, without any direct light reaching the user's eye. Because a 10-power magnifier is most effectively used when held directly to the eye and less than an inch from the object, built-in illumination is highly desirable in order to observe the fine detail for which the magnifier is used.

The lens system is the Bausch & Lomb Coddington, used in a black tenite mount with chrome-plated handle.

The instrument retails for $7.50.

CARL BIESER ELECTED TO GRUEN BOARD OF DIRECTORS

Mr. Carl W. Bieser, vice president in charge of manufacturing of the Gruen National Watch Case Company, has been elected a member of the board of directors of the Gruen Watch Company, filling the vacancy created by the death of Mr. George J. Gruen, former chairman of the board.

Mr. Bieser has been associated with the case manufacturing subsidiary of the Gruen firm for 30 years. Under his direction, case production facilities have been greatly expanded by the establishment in 1949 of manufacturing operations in the new Gruen plant in Norwood, Ohio.

HAMILTON LAUNCHES 'JEWELER'S SHOWCASE' SHOW

Thirty retail jewelers met in the studios of WGAL-TV, Lancaster, Pa., recently, to preview the first presentation of Your Jeweler's Showcase, a new television series that opened in 20 of the nation's top markets. This demonstration of the station's television facilities was a feature of one of several Preview Parties planned by the TV stations to launch Your Jeweler's Showcase in various cities. Hamilton Watch and International Sterling co-sponsor Your Jeweler's Showcase on alternate weeks.

Following the tour of WGAL-TV's studios the group adjourned to a nearby Lancaster hotel. Walter E. Miller, WGAL-TV station manager, introduced Lowell F. Halligan, Hamilton's vice president in charge of sales, who briefly summed up the aims of the new TV show, "to give the local jeweler increased consumer recognition." Mr. Halligan noted that the salute to jewelers which opens each show in the series, clearly defines the jeweler's position in the community. The salute begins, "Your jeweler is a merchant craftsman—a friend to whom you can go with confidence for truly expert guidance and council." Mr. Halligan outlined the problem jewelers face today because of "chiselling

in" operations by other types of retail outlets that offer the public so many traditional jewelry store products. He warned that unless jewelers rally to their own defense, close ranks and identify themselves with brands that confine their sales to jewelers they could lose their cherished consumer franchise by default.

After seeing a special showing of the first complete program the jewelers were entertained at a buffet supper by the WGAL-TV management. During the discussion period that followed many of the jewelers present voiced enthusiastic comments about the caliber of the show, the way it spotlighted the unique service jewelers offer and the skillful presentation of the Hamilton commercials.

HAMILTON MARKETS NEW WATCH OIL PML #79

PML No. 79 oil, a new, improved watch lubricant, representing ten years of intensive research in the Hamilton Watch Company's oil research laboratories is now being distributed through the company's materials wholesalers. The quality and performance of PML No. 79 oil was tested and proved for two years through actual use in the Hamilton factory and by many independent watchmakers.

The new oil is suitable for use in all sizes of watch movements. PML No. 79 oil contains all the necessary properties to assure long and accurate performance of a watch. It has high resistance to spreading and eliminates the need for preliminary anti-spread treatment of jewels and bearing surfaces. It does not corrode the metal parts of the watch movement. PML No. 79 oil does not evaporate and does not affect shellac. It has excellent lubricating qualities. The oil remains fluid below freezing temperatures and is highly resist-

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Statement of the Ownership, Management, and Circulation required by the Act of Congress of August 24, 1912, as amended by the Acts of March 3, 1933, and July 22, 1946 (Title 39, United States Code, Section 233.)

Of the American Horologist and Jeweler, published Monthly at Denver, Colorado, for October 1, 1952.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Roberts Publishing Company, 1901 E. Colfax; Editor, Orville R. Hagans, 1901 E. Colfax; Managing editor, George Martin, 1901 E. Colfax; Business manager, Henry J. Koops, 1901 E. Colfax.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

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4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semi-weekly, and triweekly newspapers only.)

HENRY J. KOOPS,
Business Manager.

Sworn to and subscribed before me this 8th day of October, 1952.

JOSEPHINE F. NEISLAR.

(SEAL)
(My commission expires January 10, 1953)

How to Lose a Sale . . . Perhaps a Customer

By CHARLES P. FITZ PATRICK

The attractive watch so interestingly displayed in the store window captured the eye of Cora Customer. But the $47.50 price tag presented an immediate barrier to the girl who worked in a nearby assembly plant.

Each day as she passed the jewelery shop she stole a glance at the dainty timepiece. All the while she was thinking how she could make it her very own. Then she got an idea. Walking into the store one evening she asked the owner, Robert Retailer, about the watch and honestly explained that she was not in a position financially to purchase it outright nor had she established credit in any other store. It was at this point that she suggested that the watch might be put aside for her if she paid one dollar each week until her Christmas fund ran out and then she would pay whatever balance remained. Retailer thought over the idea and agreed it would be satisfactory.

Every Friday evening Cora Customer visited the store and paid a dollar and received a receipt from the proprietor. The watch had been removed from the window and was put in the safe because it was the last of that model Robert Retailer had in stock. The girl's payments continued regularly for six weeks. Then she missed her visit to the store. The following Friday, however, she was back again to make a payment, but a few weeks later work at the plant where she was employed slackened and the girl was forced to go on short time. The importance of the dollar she agreed to pay every Friday loomed larger. After having made eleven payments she was laid off. Further payments were impossible.

With admirable honesty the pretty young miss told her story to Robert Retailer and asked if it would be practical for him to return to her the money she had already paid toward the purchase of the watch. Under ordinary conditions the store owner might have agreed immediately to the request so as to avoid having his name discussed unfavorably among the plant workers with whom the girl was friendly. Also, the girl had not received any benefit from the watch which still could be oered for sale as a new timepiece. However, since setting the watch aside for the prospective purchaser it had become a discontinued model and was being offered at a 20 per cent discount by other retailers.

Retailer studied all these factors after asking the girl to return in a few days. He learned, too, that in his state the holding of the funds of another person who does not receive or has not received anything in return is a procedure that comes under the banking laws.

To preserve his good will and to prevent legal complications, Robert Retailer decided to return the eleven dollars he had been holding for Cora Customer. He lost a sale—and probably some cash, too—but he gained experience. Now, his credit arrangements are along tested and proved lines.

A jeweler who goes around town telling folks he has a lot on his mind is usually just bragging.

Inflation wouldn't be so bad—if it wasn't for the price of everything.

Still, inflation isn't too bad. It just means that jewelers who didn't have a shirt to their name ten years ago, now don't have two shirts to their name.

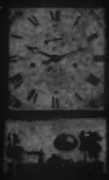
A jeweler with a big heart will always be more successful in the business than a jeweler with a big mouth.

I've known some watchmakers who, when they said they were at their wit's end, didn't have far to go!

Everything is relative in the jewelry business—especially when an uncle or brother-in-law wants some credit.

"Confidentially, 99 out of 100 doctors are switching to this watch."

THE BOOK OF AMERICAN CLOCKS



Brooks Palmer

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Game Warden: "Yes, Ma'am."

Voice: "Thank goodness, I have the right person at last. Would you please give me some suggestions suitable for a child's birthday party?"

—o—

It isn't so much what a woman says that hurts; it's the number of times she says it.

—o—

You'd never know some folks were on a vacation if they didn't return.

—o—

The new colored hair
May prove a flop;
Too many women are
Blueing their top.

—o—

One of these days we may be saying that what this country needs is a good five-cent cigarette.

—o—

Parson Brown had concluded his sermon and was making the announcements for next week.

"And now, my bred'ren," he said, "next Sunday I will speak to you upon the condition of the the church and my topic will be The Status Quo."

"Pardon me, Parson," interrupted Deacon Jones, "but what do that mean?"

"Well, Deacon," rejoined the parson, "dat's Latin for we's in a hell of a fix."

—o—

A lady went to a style show and was attracted by an evening gown worn by a curvaceous model. "That would look nice at our party next Saturday," she hinted to her husband and was she upset when he retorted "Sure would. Why not invite her?"

—o—

Customer: "Remember that cheese you sold me yesterday?"

Grocer: "Yes, madam."

Customer: "Did you say it was imported or deported from Switzerland?"

—o—

A pre-medical student had a date with his girl, and he was doing his best to get somewhere. He asked if he might put his arm around her waist, and she consented. He proceeded to encircle. "Say," she protested, "if that's where you think my waist is, darned if I'd go to you to have my appendix removed."

☆

During a sidewalk interview in Amarillo, Texas, an announcer asked a woman: "What did your husband say when he proposed?" She replied that he just said he loved her and wanted her to marry him. "Didn't he do anything to back up his statement?" the announcer said.

"Oh, yes," she replied brightly. "We have two sons!"

"Shockproof, I'll say! I wore it all during the atomic tests in Nevada."

One night the announcer for the Pot o' Gold program telephoned a woman to report that she had won the $1900 prize. Since she was not at home, a boarder who answered the phone was asked the first thing the landlady would do with the money.

"Count it," was the prompt reply.

—o—

A woman arriving in this country after a short visit to the continent was asked the usual question by the customs official at the landing port: "Anything to declare, madam?"

"No," she replied, sweetly, "nothing."

"Then, madam," said the official, "am I to take it that the fur tail that I see hanging down under your coat is your own?"

—o—

Pat and Mike were duck hunting. Pat saw a wild duck far overhead, and give it both barrels. To his delight, he saw the bird fall to the ground.

"Ye wasted that powder, Pat," said Mike.

Pat turned to Mike and asked: "Didn't I get the bird?"

"Sure you did, Pat, but the fall would have killed him anyway."

☆

A woman tourist in Flor
was admiring an Indian's ne
lace. "What are those thing
she asked. "Alligator te
ma'am," replied the Indian. "
I see. I suppose they have t
same value for your people th
pearls do for us." "Not quite
he answered gravely. "Anyon
can open an oyster."

—o—

He could neither read n
write, but when a distant re
tion died and left him a sm
fortune he started to make
splash. He acquired a che
book, but instead of signing h
name on checks he put t
crosses, and the bank paid.

Then one day he handed th
cashier a check signed with thr
crosses.

"What's this?" demanded th
cashier. "You've put thr
crosses here."

"I know," was the reply, "b
my wife's got social ambition
She says I must have a mid
name."

—o—

Ma: "Dad, I'm worried abo
Joe's arithmetic. It's terrible; h
says seven and four m
twelve."

Dad: "Shucks. I think tha
pretty good for a little shaver
his first year in school. He on
missed it by two."

—o—

The trouble with many peop
who boast of keeping an op
mind is that they keep the mi
open for the purpose of lettin
something out instead of takin
something in.

—o—

'Doctor, I'm worried. Last nigh
I dreamed I was alone with
thousand beautiful blonds, and
thousand beautiful brunettes, an
a thousand beautiful red-head
It was horrible, Doc."

"What's so horrible about it"

"I dreamed I was a girl too"

—o—

Carl was telling his mothe
about his first day at school
"Today the teacher asked
how many brothers and sister
I had, and I told her I was th
only child."

'And what did the teache
say?" asked his mother.

"Oh, she just said, "Thank
goodness!" Carl replied.

The football season is the on
time of the year when girls whi
tle at the boys who wear sweat
ers.

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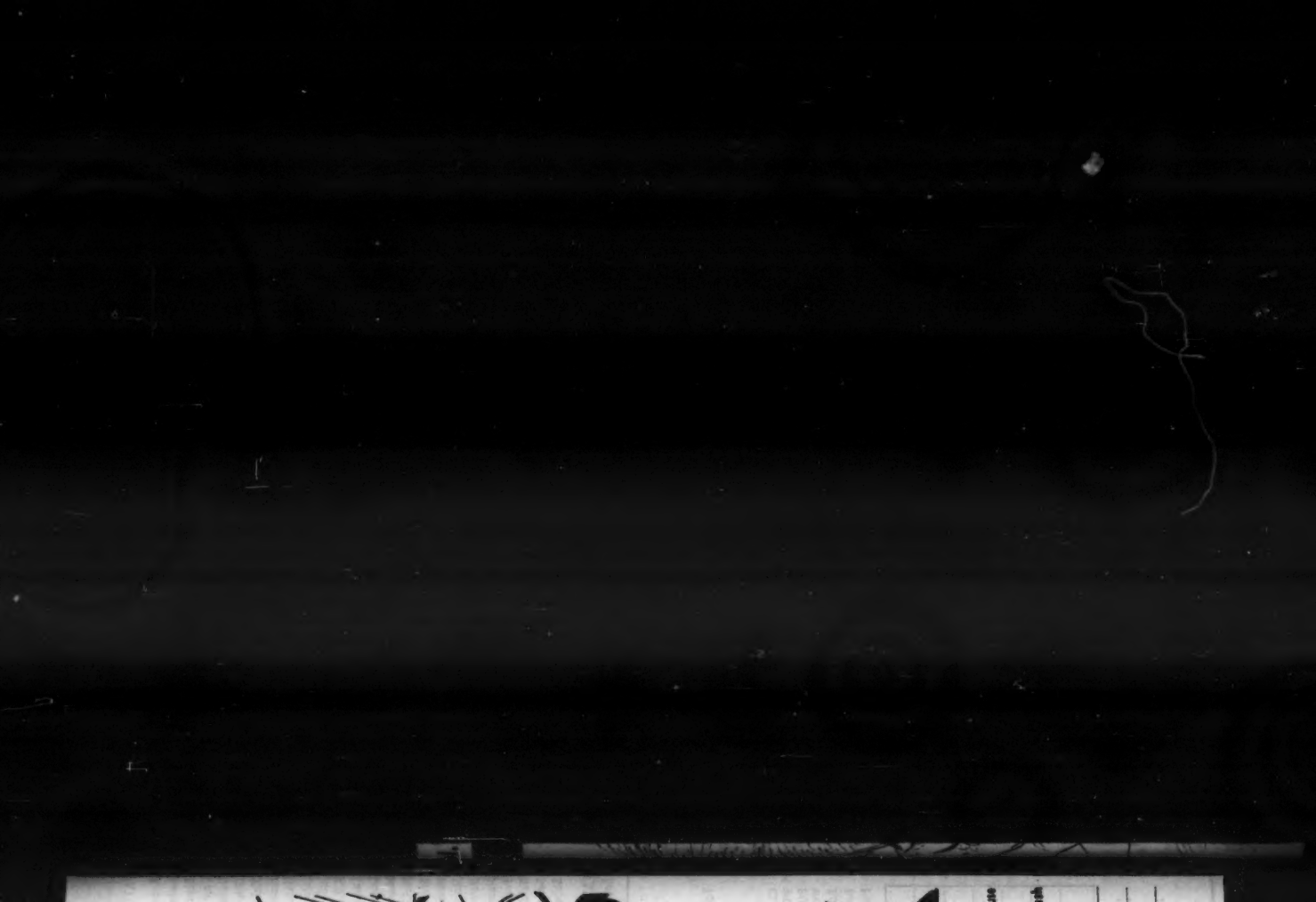
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